CITY OF LOMA LINDA

URBAN WATER MANAGEMENT PLAN

JUNE 2006

ENGINEERING RESOURCES
OF SOUTHERN CALIFORNIA, INC.

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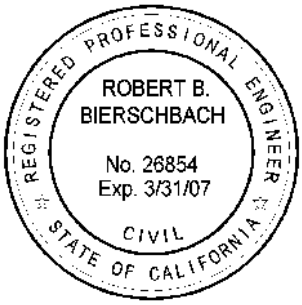
Prepared For:

CITY OF LOMA LINDA
DEPARTMENT OF PUBLIC WORKS
25541 Barton Road
Loma Linda, CA 923 54

Prepared By:

ENGINEERING RESOURCES
OF SOUTHERN CALIFORNIA, INC.
1820 Commercenter Circle
San Bernardino, CA 92408
(909) 890-1255

ERSC # 02007.008



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SECTION ONE

AGENCY COORDINATION

1.1 Introduction

The purpose of this report is to update the Urban Water Management Plan (UWMP) for the City of Loma Linda, as required by State Assembly Bill (AB) No. 797-Klehs. This UWMP includes a brief description of the City of Loma Linda's (City) water system, develops information on water use and current water conservation measures, analyzes future projections of water supply needs, as well as alternate conservation measures, and includes their implementation schedules. The UWMP is an update to the 2002 UWMP prepared for the City by ***Engineering Resources of Southern California, Inc***.

The City staff have reviewed this UWMP and, based on their recommendation, will be adopted by the City Council following a public hearing where testimony will be taken and the UWMP modified, if necessary. The UWMP then becomes the guideline for water conservation within the City's water system, requiring upgrading at least every five years.

1.2 Background

The California State Legislature passed the Urban Water Management Planning Act (AB 797, California Water Code, Division 6, Part 2.6, Section 10610-10657), which was signed into law by Governor Deukmejian on September 21, 1983. The State Water Code was further amended by Assembly Bill 2661, approved by the Governor on July 18, 1990 as it relates to urban water conservation. The Bill requires urban water suppliers providing water for municipal purposes to more than 3,000 customers or supply more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP. The City of Loma Linda qualifies under both definitions.

The Legislature enacted two measures that modified the Act in 1991. The first measure requires water suppliers to include an urban water shortage contingency analysis as part of its UWMP (AB 11). This measure also exempts the implementation of urban water shortage contingency plans from California Environmental Quality Act (CEQA). The second measure requires an UWMP to describe and evaluate water recycling activities, to be updated once every five years, to include an estimate of projected potable and recycled water use, and to describe activities relating to water audits and incentives (AB 1869).

In 1993, the Legislature enacted a measure, which allows members of the California Urban Water Conservation Council (CUWCC) to submit to the State a copy of their annual report to the Council to satisfy current reporting requirements relating to UWMPs (AB 892).

The Legislature enacted two additional measures in 1994. The first measure, Senate Bill (SB) 1017, authorizes an urban water supplier to recover the costs incurred in preparing its Plan and implementing the reasonable water conservation measures included in the Plan. The second measure requires water suppliers to give greater consideration to recycled water in their UWMPs (AB 2853).

In 1995, the Legislature enacted two additional measures. The first measure requires urban water suppliers to include, as part of their UWMP, a prescribed water supply and demand assessment of the reliability of their water service to their customers during normal, dry, and multiple dry water years (AB 1845). The assessment shall compare total water supply sources available to the supplier with the total projected water use over the next 20 years, in 5-year increments. The second measure makes the following changes to the Urban Water Management Plan Act (SB 1011):

Requires urban water suppliers to update their UWMP at least once every five years on or before December 31 in the years ending in 5 and 0. Requires urban water suppliers to include a prescribed water supply and demand assessment.

1. Requires suppliers to encourage active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during preparation of the UWMP.

2. Prior to adopting the UWMP, the urban water supplier shall make the UWMP available for public inspection and shall hold a public hearing.

3. Exempts suppliers who are implementing a conservation program from conducting a cost-benefit analysis of those conservation programs.

4. Requires the Department of Water Resources to submit a report to the Legislature summarizing the status of UWMPs on or before December 31 in the years ending in 1 and 6.

In 2001, the Legislature enacted AB 901 (Daucher) and SB 610 (Costa). The first measure incorporates changes in Section 10631 of the Water Code (AB 901) and the second measure requires additional information to be included as part of the UWMP if groundwater is identified as a source of water (SB 610).

1.3 Scope of Work

In preparing the UWMP, the following scope of work was developed utilizing guidelines provided by the California Department of Water Resources.

1. Provide a brief summary and map describing the City's water system, including sources, facilities, and operations.

2. From available records, prepare a brief summary of historical, current and projected water use in terms of annual consumption. For the current year of record, estimate the percentage of use from various categories such as residential, industrial, commercial, etc.

3. Identify and describe the existing and planned sources of water available along with a description of the groundwater basins and the City's adjudicated pumping rights.

4. Discuss the reliability of the planned water sources and their vulnerability to seasonal, climatic shortage, and water quality.

5. Assess the water supply reliability and compare the total water supply sources available versus the projected future demands within the system.

6. Describe conservation measures currently in use by the City, how they are practiced and their success. Both structural measures such as meters and retrofit devices, and non-structural methods such as rates and public information programs, are to be described and their effectiveness analyzed.

7. For those conservation measures not currently practiced by the City, prepare an analysis of the potential for improved efficiency of water use if alternative conservation measures were adopted. In the analysis, address the potential costs and other significant economic, environmental, social, health, and technological impacts, as appropriate.

8. Develop a history and description of the City's supply deficiencies, if any. This description should include the available source(s), capacity, their production, frequency of problem, actions taken, and plans for development of new sources.

9. If a future expansion of water supplies is needed, identify the projected amount of additional water supply and sources necessary to operate the water system without deficiencies.

1.4 Update in General

The region has been experiencing a drought that started in 1999 and continued until late 2004 causing water levels in wells to decline. From December 2004 to May 2005, the region experienced above average rainfall that recharged many of the local groundwater basins. The City, which receives all of its water supplies from the Bunker Hill groundwater basin was not affected by declining water levels due to the drought, but has experienced water quality issues.

Samples taken from the City's groundwater supply have shown at times high levels of several contaminants including flouride, arsenic, DBCP and Perchlorate. The chemical Perchlorate, which is used in the manufacture of rocket fuels and propellants has been detected in the City's groundwater wells. Perchlorate is highly soluble in water and is believed to have potential effects on human health.

With the implementation of the new arsenic regulation, which lowers the maximum contaminant level (MCL) to 10 ppb from 50 ppb, several of the City's wells will be affected. Through blending plans and well head treatment the City plans to continue to utilize this source of water and minimize their need to purchase more expensive imported water supplies.

1.5 Data Sources

The City prepared this UWMP with input from consultants, public review, City personal and planning documents from various sources. Frequent references and information used to compile this report have been obtained from data provided by the City, including judgments, ordinances, articles and reports as well as the following:

City of Loma Linda Urban Water Management Plan, of October 2002, prepared for the City by *Engineering Resources of Southern California, Inc.*

City of Loma Linda Draft General Plan, of October 2005, prepared for the City by *LSA Associates, Inc.*

City of Loma Linda Water System Evaluation, of June 2001, prepared for the City by *Montgomery Watson.*

City of Loma Linda Water Supply Evaluation, of June 2001, prepared for the City by *Montgomery Watson.*

City of Loma Linda Water Master Plan, of April 1998, prepared for the City by *Montgomery Watson.*

1.6 Agency Coordination

The City of Loma Linda shares its water supplies with many local water purveyors. Therefore, development of this analysis has been coordinated with the involved parties either through direct contact with staff, or through review of Drought Contingency Plans and other documents prepared by those agencies. These agencies include the following:

San Bernardino Valley Municipal Water District (SBVMWD)
City of Redlands Water Department
City of San Bernardino Municipal Water Department

A coordinated response to water supply shortages is necessary for uniformity in developing, implementing and enforcing Drought Contingency Plans. The City of Loma Linda's primary source of water is groundwater wells within the upper Santa Ana River Basin. The City's groundwater wells are located within the Bunker Hill Basin, being the major ground basin in the upper Santa Ana River Basin.

The City is a member of, has participated in, or works in conjunction with the following:

Upper Santa Ana Water Resources Association (USAWRA) - An association of all the public retail water purveyors that pump out of the Bunker Hill Basin.

San Bernardino Valley Municipal Water District (SBVMWD) - SBVMWD covers a service area of about 325 square miles, contains a population of approximately 600,000 and is a State Water Contractor (SWC) with an annual entitlement of State Project Water (SPW). SBVMWD imports SPW to water agencies within their boundary, as well as artificially recharge of the groundwater basin. SBVMWD has a maximum entitlement of 102,600 acre-feet per year (AF/Yr) of SPW, and has developed extensive regional facilities to transport both local and SPW within their District. SBVMWD's primary function is to plan and develop a long-range water supply for water agencies within the upper Santa Ana River Basin and to act as the water master for the ground water basin.

SBVMWD in conjunction with many of the retail water agencies within its boundary recently received a grant through Proposition 50 to create an Integrated Regional Groundwater Management Plan (IRGMP). The IRGMP will provide coordination between all of the existing planning documents and legal documents within their district which govern the management of groundwater and surface water.

The City of Loma Linda has participated in the coordination of the preparation of this UWMP as required under the California Urban Water Management Planning Act. The City will periodically review and adopt any changes or amendments to the plan.

SECTION TWO

CONTENTS OF URBAN WATER MANAGEMENT PLAN

2.1 Appropriate Level of Planning for Size of Agency
(California Water Code Section 10630)

The City of Loma Linda is the municipally-owned utility that provides potable water at retail within the City. The City is part of the greater San Bernardino-Riverside-Ontario metropolitan area and is located about sixty miles east of downtown Los Angeles. It is situated in an interior valley of Southern California known as the San Bernardino Valley and within the Santa Ana River Basin Watershed. Lands within the City have a gentle upward slope to the south with the foothills of the San Timoteo mountains providing its southern boundary.

The City has a population of over 21,000 people and encompasses 7.8 square miles. It is bounded on the north by the City of San Bernardino, on the west by the City of Colton, on the east by the City of Redlands, and on the south by the San Bernardino/Riverside County Line. The City boundaries are generally described as the Interstate 10 freeway to the north, California Street to the east, Oakwood Drive to the west, and including a portion of the San Timoteo Mountains to the south. The general vicinity of the City, and the specific City Limits and Sphere of Influence, are shown graphically in **Figure-1** and **Figure-2**, respectively.

2.1.1 Water Service Area

Water use in the City's service area is related to economic, demographic, and climatic factors. Increases in population have offset decreases in agricultural water use over the last 25 years and economic growth will continue to influence water use in the future. The Riverside-San Bernardino area is expected to lead the state in new residential construction activity.

The City's service area lies within the boundaries of the SBVMWD. The SBVMWD is one of many agencies contracting with the State of California to receive Northern California Water as a part of the California Water Plan.

2.1.2 Existing Water System

The City of Loma Linda's Department of Public Works (City) provides water service to all the area within the City limits including the Veterans Administration Hospital and the Loma Linda Community Hospital. The City does not provided water services to the Loma Linda University Campus and Medical Center facilities, which operates on a separate self-contained system. The City will be providing service to the City's Sphere of Influence in the future.

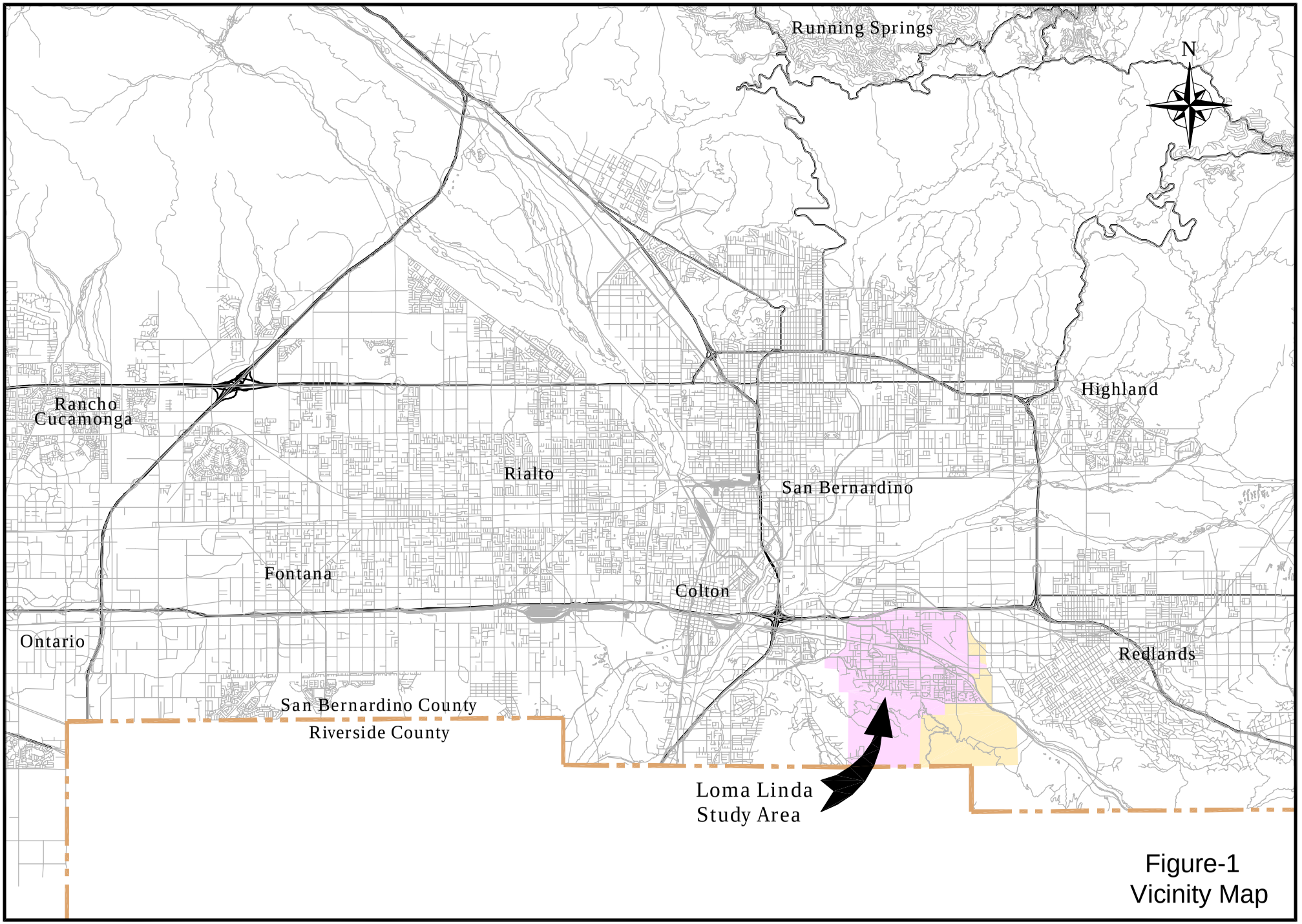

Figure-1
Vicinity Map

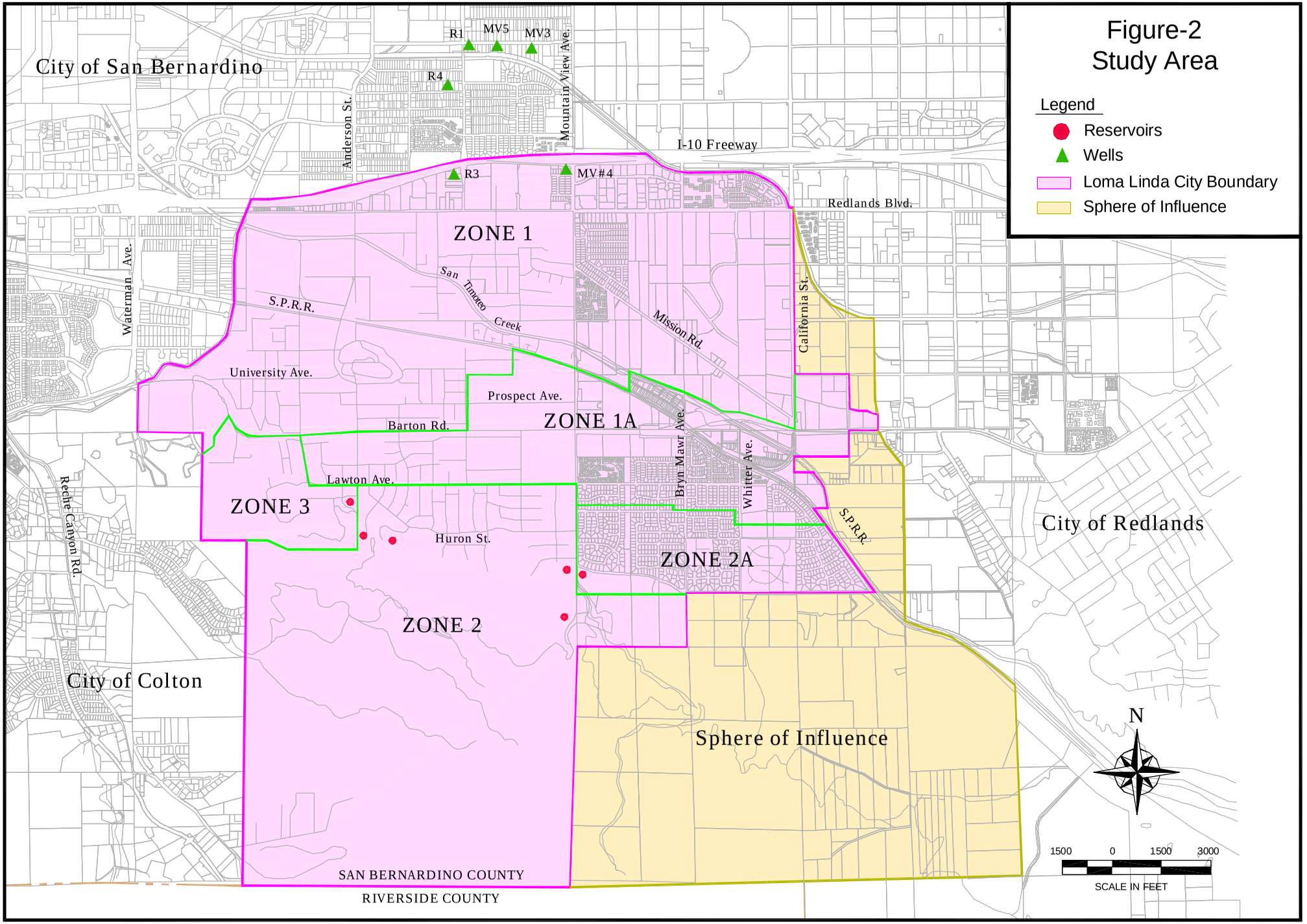
Figure-2
Study Area
Legend
Reservoirs
Wells
Loma Linda City Boundary
Sphere of Influence
City of San Bernardino
R1
MV5
MV3
R4
R3
MV#4
Anderson St.
Mountain View Ave.
I-10 Freeway
Redlands Blvd.
ZONE 1
San Timoteo Creek
S.P.R.R.
Waterman Ave.
Mission Rd.
California St.
University Ave.
Prospect Ave.
ZONE 1A
Barton Rd.
Bryn Mawr Ave.
Whittier Ave.
Lawton Ave.
ZONE 3
Reche Canyon Rd.
Huron St.
S.P.R.R.
City of Redlands
ZONE 2A
ZONE 2
City of Colton
Sphere of Influence
N
1500 0 1500 3000
SCALE IN FEET
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY

The City's system consists of a series of ground water wells, transmission and distribution pipelines, pump stations and ground level storage reservoirs. All services, including City parks, landscape maintenance and facilities are metered.

The City's existing distribution system consists of over 71 miles of pipeline varying in size from 1.5-inch to 24-inch in diameter. Approximately 95 percent of the waterlines installed prior to 1988 are dipped and wrapped steel. The remainder of the pipes are asbestos cement, and one percent is polyvinyl chloride. All new water mains are specified to be only ductile iron pipe or PVC pipe, per AWWA C-900. The majority of the existing pipelines are between 8 inches and 12 inches and are located in Zones 1 and 1A. The overall condition of the system is believed to be relatively good. Older lines are upgraded and repaired as necessary. These existing pipelines are sufficient to convey water for the existing demand conditions; however, some new transmission lines are necessary to accommodate future growth.

The City's water system currently includes five primary pressure zones and two relatively small hydro pneumatic zones. These zones are separated by PRV's, pumps, and normally closed valves. The distribution system is served from six reservoirs, four steel tanks and two prestressed concrete structures. All of the reservoirs, except the last two mentioned, are above ground. Together, they have a total storage capacity of 14.9 million gallons.

2.1.3 Production and Consumption

Demand within the system includes domestic, commercial/ institutional and landscape irrigation and increases during the summer months, June through September, when little or no precipitation occurs. Water use in the City of Loma Linda for the Fiscal Year of 2005 was 5,598 and 4,571 acre-feet (AF), in terms of water production to the system and metered sales, respectively. This represents 18% of unaccounted for water loss and a 1.3 % decrease in production over the previous year.

The unaccounted for water loss is thought to be from line flushing, accounting discrepancies, fire fighting and meter reading errors as City personnel feel the system does not contain an overabundance of pipeline leakage.

Water production for the past seven years has remained relatively constant with residential demands consuming the majority of the supply.

The data shown in Table 2-1 was compiled by the Public Works Department staff from meter readings of production wells and water consumption from customer services. Production and consumption numbers from 1982 to present are represented.

Table 2-1
Past Domestic Water Consumption

Year	Production (AF/Yr)	Metered Sales (AF/Yr)	Unaccounted For Water (Percent)
1982 [1]	2,551	2,170	15
1983 [1]	2,770	2,347	15
1984 [1]	2,898	2,646	9
1985 [1]	3,122	2,916	7
1986 [1]	3,628	3,283	10
1987 [1]	3,813	3,421	10
1988 [1]	3,935	3,686	6
1989 [1]	4,125	3,857	6
1990 [2]	4,372	4,098	6
1991 [2]	4,051	3,938	3
1992 [2]	4,389	4,046	8
1993 [2]	4,373	4,160	5
1994 [2]	4,744	4,199	11
1995 [2]	4,737	4,345	8
1996 [2]	4,953	N/A	N/A
1997 [2]	5,159	4,630	10
1998 [2]	4,783	N/A	N/A
1999 [2]	5,387	4,382	19
2000 [2]	5,478	4,890	11
2001 [2]	5,392	4,746	12
2002 [2]	5,563	4,801	14
2003 [2]	5,323	4,574	14
2004 [2]	5,675	4,719	17
2005 [2]	5,598	4,571	18

[1] Fiscal Year [2] Calendar Year

2.1.4 General Plan

The City of Loma Linda is currently in the process of updating their General Plan. In October 2005 a draft copy of the City's General Plan was completed and is now under review. The proposed General Plan (Plan) is a comprehensive revision and update of the 1973 Loma Linda General Plan. The City has held numerous public meetings to review this document that will be used to guide decisions regarding development within the planning area. The planning area includes lands within the City boundary as well as lands within its sphere of influence.

The Plan seeks to increase the residential land use areas and decrease those currently designated open space, agricultural and recreational. The Plan also outlines 8 special planning areas consisting of a mixed use of residential and commercial developments. These developments will be designed based on their locations within the City and their adjacent land use areas.

Within the community there is opposition to the residential densities outlined in the Plan. The major concerns are residential development in the north east section of the service area and the southern hillside area. The southern hillside area in the existing General Plan was designated as the Hillside Conservation Initiative Area and Conservation space. The proposed General Plan designates this area as Hillside Mixed Use.

A draft Environmental Impact Report (EIR) was also prepared that investigates alternatives to land uses and growth patterns as outlined in the proposed General Plan. The alternatives include a prohibition on development which would result in incremental growth, growth as outlined in the proposed General Plan, reduced residential hillside density and an increased residential alternative.

The City has received several comments on impacts that could result from the proposed General Plan. These impacts include water resources required for all of the alternatives outlined in the EIR. Implementation of the proposed General Plan would increase the future demand for water within the system beyond projections forecasted in the existing General Plan and the City's Water Master Plan. The implementation of the proposed General Plan will not result in a time frame for new development, but will outline where and the density at which development will occur.

The following table lists the existing land use designations and the proposed land use designations as outlined in the proposed General Plan. The majority of the land once designated open space is proposed to contain some form of residential development. Future land use designations will continue to promote the City of Loma Linda as a residential community.

Table 2-2
General Plan Land Use Designations

	Existing General Plan	Proposed General Plan
Open space, Agricultural and Recreation	63%	2%
Residential[1]	24%	60%
Commercial	3%	4%
Institutional	9%	5%
Industrial	1%	1%
Special Planning and Mixed Use Areas[2]	----	28%
Total	100%	100%

[1] Includes Hillside residential.

[2] It is assumed that 50% of the total acreage in the special planning and mixed use areas will be residential and the remaining as commercial, office and business park.

In preparing this 20 year management plan, future population growth will directly affect water supplies. For purposes of this report, the proposed General Plan land use designations along with population projections have been used to formulate future water use projections.

2.2 Service Area Information with 20 Year Projections
(California Water Code Section 10631 (a))

The major features of the City's climate are hot, dry summers and cool winters. Most of the precipitation occurs from November to March with little to none occurring during the summer months of June through September. The annual average rainfall in the City is approximately 16 inches per year with occasional droughts on an average seven-year cycle. Summer temperatures commonly are above 85°F and may exceed 103°F. The average monthly winter temperature is about 55°F.

The City supplies water to over 21,000 people within the City of Loma Linda and it's sphere of influence. The study area covers approximately 7.8 square miles within the City limits and an additional 3 square miles in the City's sphere of influence. The majority of the service area (63%) is undeveloped. This includes land designated open space, vacant, agricultural and recreation. This area includes the hills located in the south and the remaining orange groves.

Developed land accounts for the remaining 37% of the service area with residential land use forming the largest percentage at 24%. Single family residential makes up 14% of that area followed by rural residential at 4.5%, multi-family residential at 4.3% and the remainder as mobile homes. Land uses designated institutional, including medical, university, schools, churches, public facilities, and utilities comprise 9% of developed land. The remaining land uses consist of commercial and industrial establishments.

The 2000 Census reports that family households in the City of Loma Linda made up the majority of residential households with 60.5%, while individuals living alone was 31.2%. The remaining households where non-family households with more than one occupant. The County of San Bernardino, as an average, reported 77% of the households as family occupied and 18.4% as individuals living alone. The high number of individuals living alone in the City is due to the large student population and retirees.

The projected service area population, persons per household and household numbers for the years 2010 through 2025 shown in Table 2-3 where obtained from Table 5.B in the City's draft General Plan (October 2005) and are based on the most recent growth projections adopted by the Southern California Association of Governments (SCAG). The service area population growth rate for the year 2030 is based on the average yearly growth rate from 2005 through 2025. The projected population includes residential growth within the City's sphere of influence.

The City of Loma Linda's Public Water System Statistics for 2005 reports that there where 4,526 single family and multi-family residential connections within their service area. Metered deliveries to these residential customers was 3,461 AF or 683 gallons per day (gpd) per connection. This per connection usage was then used to project future residential demand. Future residential demand within the service area will be subject to development construction time frames and land use housing densities as outlined in the City's adopted General Plan.

Table 2-3
Projected Residential Growth

Year	Growth per Year (%)	Service Area Population	Persons per Household	Households	Connections	Projected Domestic Demand (AF/yr)[1]
2005	2.04	21,592[2]	2.85	7,576	4,526[2]	3,461[2]
2010	2.16	28,281	2.85	9,939	5,951	4,554
2015	2.20	31,529	2.84	11,092	6,642	5,082
2020	2.33	35,378	2.84	12,472	7,468	5,714
2025	2.74	40,498	2.75	14,716	8,812	6,742
2030[3]	2.3	45,400	2.63	17,261	10,337	7,909

[1] Based on 683 gpd per connection.
[2] Actual figures taken from the City's 2005 Water System Statistics.
[3] The projected service area population growth rate for 2030 is based on the average yearly growth rate from 2005 to 2025.

The proposed General Plan as with its predecessor continues to emphasize on a residential community with the majority of the land use in the planning area (within the City boundary and the City's sphere of influence) designated some form of residential. The bulk of the population growth will be in the southern portion of the City's planning area which is undeveloped.

2.3 Water Sources

(California Water Code Section 10631 (b))

The City of Loma Linda's primary source of water is groundwater wells within the upper Santa Ana River Basin. The City's six groundwater wells are located within the Bunker Hill Basin which is a vast aquifer underlying the eastern San Bernardino Valley. Replenishment of the basin is from rainfall and snow melt from the surrounding mountains and imported water.

The City currently operates five wells, ranging in capacity from 1,000 to 3,300 gallons per minute (gpm). These five wells have a total effective production capacity of 9,050 gpm. A sixth well (Mountain View #4) which yields 1,500 gpm is not being utilized due to high levels of flouride. Each well pump is driven by an electric motor, and the discharge enters a grid system and then into reservoir storage. Their operation is automatically controlled by a centralized telemetering system, which monitors reservoir levels. Table 2-4 lists the City's existing wells and their pumping capacity.

Table 2-4
Existing Water Production Wells

Well	Pumping Capacity (GPM)	(MGD)	(AF/Yr)
Mountain View #3	1,000	1.44	1,613
Mountain View #4 [(1)]	1,500	2.16	2,420
Mountain View #5	3,300	4.75	5,323
Richardson #1	1,150	1.66	1,855
Richardson #3	2,100	3.02	3,388
Richardson #4	1,500	2.16	2,420
Total Capacity	**10,550**	**15.19**	**17,018**
Total Effective Capacity	**9,050**	**13.03**	**14,599**

[(1)] This well is currently not being utilized.

2.3.1 Groundwater Sources

Bunker Hill Basin
A 1969 judgement, of Orange County Water District vs. City of Chino, et al., #117628 stipulates that the SBVMWD and Western Municipal Water District will co-manage the Bunker Hill Basin as the Water Masters. SBVMWD's primary function is to plan and develop a long-range water supply for water agencies within the upper Santa Ana River Basin and to act as the Water Master for the ground water basins within its boundaries. These two agencies have adopted a Regional Water Facilities Master Plan that manages the Bunker Hill Basin. The objectives of the Master Plan are captured in the following Mission Statement:

> "*Develop regional facilities to allow coordinated management of available water resources to meet the ultimate quantity and quality requirements of all water purveyors, and increase the reliability of supplies by maximizing the use of local water resources and optimizing the use of imported water. The regional facilities should be cost effective, and be developed in a systematic, phased program with the cooperation of the water purveyors.*"

SBVMWD is a member agency of the California State Water Project, which imports water from Northern California. SBVMWD imports SPW to water agencies within their boundary, as well as artificially recharging the groundwater basin. SBVMWD has a maximum entitlement of 102,600 acre-feet per year (AF/Yr) of SPW, and has developed extensive regional facilities to transport both local and SPW within their District.

The SBVMWD has, in their 1995 Master Plan, proposed to construct the Central Feeder and reservoir system to convey Bunker Hill Basin Pressure Zone water to Loma Linda, Redlands, and Yucaipa, particularly during dry hydro logic periods when local and SPW deliveries are limited.

In December 2001 the SBVMWD contracted with ***Engineering Resources of Southern California, Inc***., to analyzes the short term and long term supplemental water needs along the District's proposed Baseline Feeder Extension South and the South End Feeder. The areas served by these proposed facilities has been known as the District's Service Area 5.

The boundaries of Service Area 5 are generally considered to be the area south of the Santa Ana River and west of Mountain View Avenue, and all of the areas that are tributary of Reche Canyon Creek south of San Bernardino County Line within the Districts boundaries. The incorporated areas within Service Area 5 boundaries are the City of Loma Linda, the City of Colton, the City of Grand Terrace, portions of the City of San Bernardino south of the Santa Ana River, and the unincorporated area of Reche Canyon.

The Service Area 5 Report for Supplemental Water Supply is a regional plan for conjunctive use /contamination mitigation and high groundwater mitigation of the basin. It considered the alternatives for the proposed Baseline Feeder Extension South to move large amounts of potable water within the Bunker Hill Groundwater Basin Pressure Zone between the proposed 9th Street Feeder at Baseline and Meridian, and the proposed Central Feeder at Barton Road and Hunts Lane in San Bernardino. This 60-inch pipeline will be a regional transmission line that will be owned by SBVMWD and operated by the San Bernardino Municipal Water District.

The Central Feeder system includes extraction wells which will be equipped with well head treatment that will remove the chemicals and make the water usable for municipal use. This will contribute to the cleanup of the contamination plumes and help to control water levels by increasing extractions.

The wells along this transmission line will extract water from the middle level of the basin, which is the main aquifer drawn from, and well head treatment will be provided to remove the VOC from this water supply through air stripping and or granulated activated carbon. This treatment is done on a regional basis so that all water quality will meet the Department of Health Services (DHS) requirements for potable water. This project will provide the City of Loma Linda 11 cubic feet per second (cfs) (4,937 gpm) of potable water to augment their groundwater well supply. Additional supply would be available to the City of Loma Linda should it be needed. Construction of the Baseline Feeder Extension South to move large amounts of potable water within the Bunker Hill Groundwater Basin Pressure Zone is currently in progress. The Central Feeder is one of the key components of the District's Regional Water Facilities Master Plan which includes groundwater banking and conjunctive use program for the Bunker Hill Groundwater Basin which is a very large and complex aquifer system.

The City of Loma Linda has unrestricted pumping rights from the Bunker Hill Basin. The only stipulation being that all water is to be used within the boundaries of the SBVMWD. Should the demand on the basin by all local cities exceed a certain number, then SBVMWD is obligated to supply SPW to replenish the basin.

2.3.2 Basin Description

The Bunker Hill Basin covers approximately 92,000 acres at the top of the Santa Ana River watershed and receives all of the surface water runoff from the headwaters of the Santa Ana River, Mill Creek, Lytle Creek and other tributaries.

The groundwater basin is managed to provide a large and more secure water supply for the growing region. The basin has two major and difficult challenges to manage. The first challenge is that there are high groundwater levels in a portion of the basin and the second is that parts of the basins aquifers have chemical contamination.

The area of high groundwater is in the south western part of the basin where groundwater levels have been at or above the ground surface. These high levels are consistently close enough to the ground surface to create a high liquefaction potential during an earthquake. The City of Loma Linda's ground water wells are located in the high groundwater area of the Bunker Hill Basin, which would be the last area of the basin that would experience a decline in pumping levels.

The chemical contamination within the basin is from past industrial operations which have formed plumes of toxins in certain aquifers. The basin also has high nitrate levels which originated from the region's former citrus groves.

The Bunker Hill Basin provides water to over 650,000 people in the Cities of Redlands, Highland, San Bernardino, Loma Linda, Colton, Rialto, Bloomington, Fontana, Grand Terrace, Riverside and portions of San Bernardino County.

The Bunker Hill Groundwater Basin contains over 5,000,000 acre feet of water and has sufficient supply for many consecutive drought years without any natural recharge. Historically, ground water pumping within this basin has been partially controlled by a court judgment, which determined that the safe yield for the Bunker Hill Basin was 232,100 acre-feet per year. It is believed that this control on pumping, combined with SPW deliveries and annual rainfall is sufficient to replenish the basin storage level for all potential future demands.

2.3.3 Past Basin Production

The City's use of water supplies depends on the system's daily demand which varies from winter to summer. The City chooses to be self reliant and avoids purchasing costly supplemental water if possible. Purchased water has not been utilized by the City for the past three years. Prior to that, additional water supplies where only utilized when City wells tested positive for perchlorate, flouride and nitrates. Of the City's water production, 100% is derived from groundwater within the Bunker Hill Basin.

Table 2-5
Amount of Groundwater Pumped (AF/Yr)

Bunker Hill Basin	2000	2001	2002	2003	2004	2005
City Groundwater Wells	4,879	4,707	5,411	5,322	5,675	5,598
Purchased from SBVMWD	599	685	152	0	0	0
Total Supply	**5,478**	**5,392**	**5,563**	**5,322**	**5,675**	**5,598**
% of Total Supply	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Due to the location of the City's groundwater wells within the Bunker Hill basin, the City's production is not affected during drought conditions. The annual amount of groundwater pumped from 2000 to 2004 represents the City's production capacity during the most severe of drought conditions. The amount of groundwater produced has been sufficient to supply demands within the system.

2.3.4 Projected Basin Production

The City of Loma Linda's ground water wells are located in the area of the south western part of the basin where groundwater levels have been at or near the ground surface. This area of the basin would be the last area of the basin that would experience a decline in pumping levels.

Future water supply for the City will be from the City's groundwater wells in the Bunker Hill basin and from two future wells that will be drilled by Lockheed Martin to mitigate groundwater contamination. The Lockheed Martin wells are planned to be operational in 2008 and are expected to yield 3,000 gpm each. Once construction of these wells is completed the City will utilize the supply from the Lockheed Martin wells and use Mountain View well # 3 and Mountain View well #5 as standby water sources.

Implementation of the draft General Plan would increase the projected future water demands beyond those calculated in the City's latest Water Master Plan. The amount of ground water projected to be pumped is based on future demands as shown in Table 2-9. Should additional supply be required, the City will have the necessary infrastructure and wells in place to provide it.

Table 2-6
Amount of Groundwater Projected to be Pumped (AF/Yr)

Bunker Hill Basin	2005	2010	2015	2020	2025
Groundwater Wells	5,598	6,851	7,852	8,971	10,540
% of Total Supply	**100%**	**100%**	**100%**	**100%**	**100%**

If future water supplies show high levels of contaminants, the City will install treatment facilities or prepare a blending plan instead of purchasing more expensive water supplies.

With the construction of the Lockheed Martin wells and the planned water supply projects as outlined in Section 2.9, the City is projected to have sufficient groundwater available to meet future demands. The City does not want to rely on expensive purchased water supplies, but could on a short term basis, should unforseen events prevent the use of their wells.

2.4 Reliability of Supply
(California Water Code Section 10631 (c))

As with all water supplies in Southern California, the City's water supply is vulnerable to chemical contamination and to seasonal and climatic changes within the area based upon precipitation patterns and may vary substantially from one year to the next.

The Bunker Hill Basin has proven to be a very reliable water supply for the City even during multiple-year droughts such as 1987-1992 and 1999-2004. The basin Water Master (SBVMWD) annually reviews groundwater conditions in the basin to assess high groundwater conditions.

In addition to groundwater wells, the City also has various interconnections with adjacent water systems such as the University of Loma Linda, the City of San Bernardino and the City of Redlands, to assist in alleviating localized problems should they arise.

2.4.1 Basis of Water Year Data

As all of the City's water supply originates from the Bunker Hill groundwater basin, the vulnerability to seasonal and climatic shortages in this basin will be the basis for water year data. In the Bunker Hill basin, 1996 was chosen to represent a normal water year. The single-dry year of 1994 represents the lowest annual runoff for this watershed. A multi-dry year period is generally defined as "three or more consecutive years with the lowest average annual runoff". For this period, 2002 through 2004 was selected. The selection of these three years as the multiple-dry year period represents more current pumping habits, existing land uses and recent basin management activities.

Table 2-7
Basis of Water Year Data

Water Year Type	Base Year		
Normal Water Year	1996		
Single-Dry Water Year	1994		
Multiple-Dry Water Years	2002	2003	2004

The Bunker Hill basin water level, in the area where the City has its production wells, is fairly consistent. These wells are located at the most southern and bottom area of the basin which would be the last area of the basin to be affected during a drought. As can be seen from the production numbers from 2002 through 2004, supply was sufficient to meet system demands. In fact, production is thought to have increased above normal year production due to increased residential irrigation demands.

During a multiple dry year cycle residential irrigation users tend to irrigate more days of the year. A normal irrigation season runs 240 to 280 days per year, but during a dry cycle that can increase up to 300 days. The City did not have to purchase additional supplies during this multiple dry year condition, nor did they have to invoke any of the water shortage stages available to them as outlined in Ordinance 443.

The following table lists the existing water supply sources and projected availability of each of the sources during a normal year, single-dry year and multiple-dry years. During a single dry water year as seen in 1994, production was 96% of a normal water year supply. Production during a multiple-dry year period is projected to be above a normal water supply year.

Table 2-8
Supply Reliability (AF/Yr)

	Normal Water Year (1996)	Single Dry Water Year (1994)	Multiple Dry Water Years		
			Year 1 (2002)	Year 2 (2003)	Year 3 (2004)
Bunker Hill Basin	4,953	4,744	5,563	5,323	5,675
% of Normal	100%	96%	112%	107%	115%

Groundwater from the Bunker Hill basin that is utilized by the City is thought to be a very reliable supply which is not vulnerable to seasonal or climatic shortages.

2.5 Transfer and Exchange Opportunities
(California Water Code Section 10631 (d))

The Water Code definition of short and long-term is that short-term is for a period of one year or less and long-term is for a period of more than one year. The City has several connections to local water systems, including the City of San Bernardino, the City of Redlands and the Loma Linda University which could provide short-term water supplies.

The City has two emergency supply connections with the City of San Bernardino, to receive up to 2,500 gpm of water. These connections are available only on an as-needed basis if the water supply is available, and cannot be counted as firm supply capacity.

The City has also installed an interconnection with the Loma Linda University water system as an emergency connection only. There exists no formal agreement for the exchange of water between the City and the University; however, the connection is metered to monitor any exchange of water.

An emergency connection with the City of Redlands, at Mountain View Avenue and Redlands Blvd. yields approximately 0.7 cfs (314 gpm) to Loma Linda by gravity. The City of Loma Linda's pressure zone has a high water level of 1,314 feet and the City of Redlands' lower pressure zone has a high water level of 1,350 feet.

The SBVMWD has a current agreement with the City of Loma Linda that provides the City of Loma Linda with 5.6 cfs (2,500 gpm) of supplemental water at their existing interconnections. The SBVMWD charges the City of Loma Linda its retail water rate of approximately $379 per acre-foot (AF) and has stated that it does not currently have an unlimited potable water supply during the summer peak demand period. The City has not purchased water from SBVMWD in three years.

The construction of SBVMWD's Baseline Feeder Extension South is currently in progress. This pipeline is designed to move large amounts of potable water within the Bunker Hill Groundwater Basin Pressure Zone. Once completed this project will provide the City of Loma Linda 11 cfs (4,937 gpm) of potable water to augment their groundwater well supply. Additional supply would be available to the City should it be needed.

2.6 Water Use by Customer - Past, Current and Future

(California Water Code Section 10631 (e))

By analyzing past and current water use by sector, we can project growth patterns and predict future demands. Future residential demand usage was based on projected SCAG population figures from Table 2-3 and 683 gallon per day per connection. Commercial/institutional, landscape irrigation and industrial usage was estimated by using the draft General Plan (October 2005) land use zoning designations.

The demands shown in Table 2-9 include the projected demands for residential, commercial/ institutional, landscape irrigation and unaccounted for water losses within the system in five year increments through the year 2025. Unaccounted for water within the City is the difference between the amount of water produced and the amount of water sold to customers from billing records. The difference can be attributed to system leakage, accounting/meter reading error, water theft, line flushing and fire fighting uses. Water loss within the distribution system has in the past ranged from 3% to 19%. Average water loss within the system for the past five years was 13.6% annually. This percentage was then used to project future unaccounted for water losses within the system.

All of the City of Loma Linda services, as well as public facilities, are metered. Table 2-9 lists the categories of customers and number of services for the past six years, and projects future water use by sector within the City boundary and it's sphere of influence in five year increments out to 2025.

Table 2-9
Water Use by Customer - Past, Current and Future (AF/Yr)

Year		Single Family	Multi-Family	Comm.[1]	Landscaping	Water Losses	Total
2000	# of Accounts	4,177	---	197	189	---	4,563
	Deliveries (AF/Yr)	2,476	943	623	848	588	5,478
2001	# of Accounts	3,888	378	198	172	---	4,636
	Deliveries (AF/Yr)	2,473	924	647	702	646	5,392
2002	# of Accounts	3,897	378	208	180	---	4,663
	Deliveries (AF/Yr)	2,628	909	580	684	762	5,563
2003	# of Accounts	3,905	378	208	180	---	4,671
	Deliveries (AF/Yr)	2,502	921	575	575	748	5,321
2004	# of Accounts	3,893	372	277	168	---	4,710
	Deliveries (AF/Yr)	2,638	884	602	596	955	5,675
2005	# of Accounts	4,149	377	244	171	---	4,941
	Deliveries (AF/Yr)	2,601	860	524	585	1,028	5,598
2010	# of Accounts	5,951[1]	---	408	170	---	6,529
	Deliveries (AF/Yr)	4,554	---	877	600	820	6,851
2015	# of Accounts	6,642[1]	---	573	170	---	7,385
	Deliveries (AF/Yr)	5,082	---	1,230	600	940	7,852
2020	# of Accounts	7,468[1]	---	737	170	---	8,375
	Deliveries (AF/Yr)	5,714	---	1,583	600	1,074	8,971
2025	# of Accounts	8,812[1]	---	902	170	---	9,884
	Deliveries (AF/Yr)	6,742	---	1,936	600	1,262	10,540

[1] Single family includes multi-family accounts.

Information in the above table regarding past usage was obtained from the City's Public Water System Statistic Reports submitted to the Department of Water Resources for the Calendar Years 2000 through 2005.

Landscaping demands within the system are not projected to increase significantly. Landscaping usage includes recreational, public open space and rights-of-ways. New landscaping demands and existing landscaping demands will be encouraged to utilize non potable water when possible. Commercial usage includes office, business park, health care, industrial, institutional and City facilities.

2.7 Demand Management Measures
(California Water Code Section 10631 (f))

Demand management or water conservation is one of the lowest-cost resources available to a water agency. It is a critical part of meeting system demands and ensuring reliable future water supply. The Urban Water Management Planning Act provides two distinct methods for providing information related to Demand Management Measures (DMM) and meeting the requirements of Water Code Section 10631 (f) and (g).

- A water supplier who is a member of the California Urban Water Conservation Council may submit their Best Management Practices (BMP) Annual Activity Report.

- A water supplier who is not a member of the Council, or chooses not to submit the Council BMP Activity Report, must include data on implementation of DMMs in their UWMP.

The City is not a member of the California Urban Water Conservation Council and does not have a Best Management Practice Report to accompany this report. The City is committed to implementing economically feasible programs that promote efficient water use and implements demand management measures wherever practical.

Several sections within the City of Loma Linda's draft General Plan (October 2005) address the need to preserve water resources through conservation. Future growth within the City's service area will be guided by the adopted Plan and its guiding policies.

- Encourage water conservation as a means of preserving water resources. Require new development to be equipped with water conservation devices.

- Develop and encourage the implementation of water conservation programs by residents, employers, students, and service providers.

- Encourage sustainable landscapes or landscapes that require little irrigation through the use of drought-tolerant and native vegetation in new development.

- Pursue the use of reclaimed water for the irrigation of all appropriate open space facilities and City projects, and encourage existing and new developments to tie into the reclaimed water system when available.

Currently, the City does not track data relating to water conserved through the demand management measures and therefore, the City does not have a means of evaluating the effectiveness of these programs. Without this data, an estimate of the existing conservation savings on the water use within the system cannot be given. The City will make additional efforts to obtain and monitor this information for future reference and analysis.

The savings that are being realized by the demand management measures and conservation efforts currently implemented will not effect the ability to further reduce demand. A request by the City to further reduce consumption within the service area would be possible. Consumers are generally receptive to reducing consumption in drought times, if the need to conserve is stressed. The additional water savings from the drought response can be measured using daily production records. This reduction, however, may only be for a short duration.

This chapter describes the water conservation programs being implemented by the City. The following data is based on information from City personnel, the City's Municipal Code and various measures presently implemented.

(A) Water Survey Programs

This sort of program requires both office and field personnel to perform the survey, analyze the data and respond with survey results. The City is not staffed for such a program and at this time has no plans to implement such a program.

(B) Residential Plumbing Retrofit

Plumbing devices which reduce water flow are a proven method to reduce water use, principally because, for operations such as showering and toilet flushing, comparable efficiency can be obtained with less water than is customarily used. This only works, however, if it is not overridden by long showers and double flushes.

Minimal Kit - A "Minimal Kit" consists of three devices in a plastic bag with printed instructions on the proper installation or use. The devices include two shower flow restrictor rings, an inflatable toilet tank displacement bag and two dye tablets for testing for toilet tank leakage. These are available to all who visit the Department of Public Works Office at the City of Loma Linda Civic Center or the City Yard.

The dye tablets reveal leaking ballcocks and flapper valves in toilet tanks. Unfortunately, only about 20% of tablets dispensed are used. Of these, it is assumed that only 50% of the leaks discovered are repaired in voluntary programs. Thus, the measure can be expected to show a 2% effectiveness and resultant savings are relatively low.

The shower flow restrictor rings reduce the rate of water flowing from a shower by about 1.3 gpm (0.4 gpm to 2.1 gpm), however, the duration of a typical shower increases. Overall water use in a shower in a typical household is about 28 gallons per day (gpd), and a restrictor will reduce that figure to about 21.5 gpd. The acceptance and installation by the public on a voluntary basis, where the customer installs the ring, is about 15%. The resulting reduction in shower flow water is, therefore, 6.5/28 x 0.15 = 3.5%. With shower water, there are significant energy savings (about 0.8 MBTU/yr/shower).

A toilet tank displacement dam is a bag made of durable plastic which holds about one gallon of water and reduces the amount of water in each flush by that amount. On a voluntary basis, about 30% of customers receiving bags can actually be expected to install them. In those toilets, about 6 gallons per day are saved, resulting in about a 6% reduction overall.

Water reduction fixtures continue to yield increased efficiency but their limits are not known.

(C) System Water Audits, Leak Detection, and Repair

System Wide Water Audit - The City Department of Public Works (DPW) presently carries out an annual audit to determine unauthorized and unaccounted for water losses. All system meters are read and tabulated for water production and sales, and estimates are made of authorized unaccounted for water, such as: main flushing, construction uses, street cleaning, main breaks, and leaks. The remaining water use is the unauthorized unaccounted for use assumed to be from leaks, seepage, evaporation, non-functioning meters, and billing errors, and accounted for 18% of the City's water production during Calendar Year 2005.

Leak Detection Program

Customer's Side - City DPW personnel investigate high water bills at the customer's request. It has been the City 's experience that in most situations, the cause of the unusual water use will consist of obvious malfunctions in plumbing fixtures such as toilets and sinks which can easily be corrected. This may indicate a need to better educate customers on the impact of seemingly small, but continuous leaks when they are occurring.

City of Loma Linda System - As mentioned above, the unauthorized unaccounted for water loss in the City system was 18% in 2005, and previous years can be seen in Table 2-1. The unaccounted for water was due in part to leaks from the older pipelines in need of replacement. The City repairs and or replaces these pipelines as necessary.

Valve Exercise Program - A valve exercising program can reduce water loss by identifying system valves in need of repair, or those which are improperly set. The City DPW mobilizes a two-man crew which is responsible for all valve activity within the distribution system. This crew operates system valves on a planned two-year cycle, when not reacting to requests for mainline or hydrant shutdown.

(D) Metering with Commodity Rates and Retrofit of Existing Connections

Metering Existing Customers - All existing customer water services in the City of Loma Linda are metered, including hydrant sales. It has been adequately illustrated that the metering of water service is a sure method of reducing total water use and peak flow.

Mayor and Council Resolution 2241, included in the Appendix, adopted on June 25, 2002, regulates the use of water and charges an increasing bi-monthly fee per hundred cubic feet (HCF) used above a certain minimum. For example, within the City, the charge for using up to 1,000 cubic feet is calculated at a rate of $0.873 per HCF; between 1,000 and 40,000 cubic feet is $1.163 per HCF; between 40,001 and 80,000 cubic feet is $1.279 per HCF; and above 80,000 cubic feet is $1.395 per HCF.

Meter Calibration and Replacement Program - The City has a policy of calibrating and/or replacing all system water meters in the 5/8-inch X 3/4-inch to 1-inch sizes every 10 years. For larger meters, the current program is every five years. Because the Veterans Administration Hospital uses large amounts of water and consequently is an important customer, the staff calibrates the VA Hospital meters once a year.

Inoperative and inaccurate meters can contribute to an increased percentage of unaccounted for water. To be effective, a program should take into consideration the meter size, type, age, water pressure, and meter location.

To improve the remote control water meter reading and to replace existing water meters with auto read water meters, the City's Annual Budget allocates funds for replacement and upgrade of existing meters and additional installations as needed.

(E) Large Landscape Conservation Program

The City does not offer financial incentives to improve landscape water use efficiency. The City of Loma Linda's Municipal Code Title 13, Chapter 13.32 Water-efficient Landscape seeks to promote the values and benefits of landscapes while recognizing the need to conserve water resources. This section of the municipal code applies to all new and rehabilitated landscaping for public agency projects and private development projects that require a permit. No permit shall be issued until the City or County reviews and approves a "Landscape Documentation Package". The Landscape Documentation Package includes the following elements;

- Calculation of the maximum applied water allowance
- Calculation of the estimated applied water use
- Calculation of the estimated water use
- Landscape Design Plan - The protection and preservation of native species and natural areas is encouraged. Recirculating water shall be used for decorative water.

- Irrigation Design Plan - The installation of recycled water irrigation systems (dual distribution systems) shall be required to allow for the current and future use of recycled water.

- Irrigation Schedule -Whenever possible irrigation shall be between 2am and 10am to avoid irrigation during times of high wind or high temperature.

- Maintenance Schedule -A regular maintenance schedule shall be submitted to ensure water efficiency.

- Landscape Irrigation Audit Schedule - Audits for all but single-family residences shall be submitted to the City and shall be in accordance with the State of California Landscape Water Management Program.

- Provisions for existing Landscapes - All existing landscaped areas that the City or County provides water that are one acre or more shall have a landscape irrigation audit at least every five years.

(F) High-Efficiency Washing Machine Rebate Program

The City does not currently implement a high-efficiency washing machine rebate program.

(G) Public Information Programs

The City promotes water conservation through a variety of outreach programs. The City of Loma Linda continues to prepare and release articles on water conservation to the local daily newspaper, the City newsletter and the media. Public service announcements, news stories and paid advertising will be used in a campaign to promote understanding and awareness of wasteful habits, water scarcity, available sources, system and treatment capacity and distribution.

Additional brochures can be obtained and distributed throughout the community and at libraries, banks and other civic-minded stores.

The overall goal of such a program is to motivate customers to purchase and install water saving devices, to participate in conservation programs (retrofit of devices), and to use water more wisely. The information imparted will result in a reduction in water use, conservation of resources and reduced need for future expansion of water supply.

This conservation program has minimal costs which are limited to purchase and mailing of brochures and some paid advertising.

Conservation literature and brochures are presently available upon request from the staff at City Hall. In general, they stress the reasonable utilization of resources and explain that the quality of life need not suffer from the use of conservation techniques.

In addition to literature and news articles, the City provides each service customer with data on water use during the similar period from the previous year. Customers will use the data to informally evaluate the results of their conservation efforts taking into consideration climatic difference, exact billing period length, and any changes they have made to their households which could affect water consumption.

(H) School Educational Programs

Presently, City staff responds to public inquiries concerning these matters. Upon request, Department of Public Works staff are available for giving talks at schools, service clubs and other similar opportunities.

(I) Conservation Programs for Commercial, Industrial, and Institutional Customers

The City does not currently implement conservation programs for commercial, industrial and institutional customers.

(J) Wholesale Agency Programs

The City does not provide wholesale water to any other retail agencies, therefore this program is not applicable to the City of Loma Linda.

(K) Conservation Pricing

The City encourages conservation through a tiered rate water pricing system. This schedule encourages conservation by charging more as consumption rises. Customers are encouraged to use water wisely and install water conserving devices to avoid the higher unit charges for water as shown in the following table.

Table 2-10
Monthly Consumption Charges

Water Usage	Inside City Limits	Outside City Limits
From 0 to 1,000 cu. ft.	$0.873	$1.004
From 1,001 to 40,000 cu. ft.	$1.163	$1.337
From 40,001 to 80,000 cu. ft.	$1.279	$1.471
80,001 cu. ft. and over	$1.397	$1.607

(1) 100 Cubic Feet = 1 Unit of Water

(L) Water Conservation Coordinator

The City does not have a dedicated conservation coordinator. Water conservation projects and programs are performed by members of the City's staff.

(M) Water Waste Prohibition

The City prohibits the wasting of water and may discontinue service if such acts are deemed to exist. Ordinance 443 amending Title 13 of the Loma Linda Municipal Code pertaining to water states that no customer shall knowingly permit leaks or waste water. Where water is wastefully or negligently used on a customer's premises, seriously affecting the general service, the utility services division (water) may discontinue the service if such conditions are not corrected within five days after giving the customer written notice.

Water Waste Reduction Program - The water conservation ordinance encourages water waste reduction and controls excessive water wastage from (1) landscaped runoff, (2) irrigation water, (3) malfunctioning equipment, and (4) water wash down.

(N) Residential Low Flush Toilet Program

The City does not currently implement a low flush toilet rebate or exchange program.

Additional Water Management Programs

Environmental Impact Reports/Statements - Benefits in water conservation can be derived from a coordinate effort with the Community Development Department (CDD), to see that proposed developments adopt a water conservation element during the environmental review period. The CDD currently requires that conceptual landscaping plans be submitted with applications for precise plan of design approval.

2.8 Evaluation of Demand Management Measures Not Implemented

(California Water Code Section 10631 (g))

An evaluation of the water demand management measures that are not currently being implemented or scheduled for implementation by the City are as follows. The evaluation takes into account economic, environmental, social, health, customer impact and technological factors.

Water Survey Program

A Water Survey Program for single-family and multifamily residential customers, as outlined by the Department of Water Resources would require the City to check for leaks, including toilets, faucets, and water meters at each customer's home. The City would also have to check flow rates of shower heads and toilets along with an inspection of the customer's irrigation system and timers. A review of the customer's irrigation schedule and measuring the landscape area would also be required. This information would then have to be analyzed and the customer would need to be provided an evaluation of their existing water consumption habits and water saving recommendations would need to be supplied.

The overall goal of such a program is to motivate customers to use water more wisely and to participate in conservation programs. The program would bring to light methods to conserve water and reduce water bills.

- Environmental Impact is positive. Less water will be used.
- Social Impact is positive, as people are reminded of water conservation, and their 'water consciousness' will be raised.
- There are no adverse Health and Safety Impacts.
- Customers will have reduced water bills following the implementation of the response to the survey.
- There are no Technological Factors involved.
- The Cost to implement such a program would include mailers that would be sent to customers, field personnel to perform the survey and the time to evaluate and respond back to the customer.
- The Benefit to the City would be the reduced demand resulting in lower supply, O&M and treatment costs.

The anticipated water savings gained by such a program would not cover the costs to implement it.

Residential Ultra Low-flush Toilet Replacement Program
An ultra low-flush toilet ordinance would result in all toilets eventually using 1.5 gallons per flush. By comparison, conventional toilets use 5.5 to 7 gallons per flush. Based on observed practices, a conventional toilet uses 33 gpd, and an ultra low-flush toilet uses 9.6 gpd, about a 66% savings.

Through a related program and ordinance, the City could require owners of existing residences to retrofit low-flow toilets in place of conventional toilets in all remodeled homes. It may be possible to require the retrofit of low-flow toilets in all homes at the time of sale. The savings will be as above.

- The Economic Impacts of the combination of these two programs will be significant. At a 10% market penetration on existing buildings, and an additional 10% for remodel or resale, the affected customer base will be using 66% less water to flush toilets than is used today. Deferred water treatment and distribution costs, as well as sewage treatment costs, will result.

- Environmental and Social Impacts will be positive. Savings in water used will result in less demand on water supply, less sewage to be treated, and less effluent to dispose of. In addition, low-flush toilets will reduce the need for expansion of treatment facilities.

- There will be no adverse Health & Safety Impacts. The customer concerns over low-flush toilets can be alleviated with explanatory literature.

- Technological factors are minimal.

- This program rates high because of the significant savings in water. It is estimated that low-flow toilets alone could save up to 22,000 gallons of water per year for a family of four.

High-Efficiency Washing Machine Rebate Program
Approximately 22% of residential daily indoor water usage is attributed to clothes washers. By installing a more efficient washing machine a household can reduce its daily per capita usage by about 35%.

- The Economic Impact - The savings would be in the range of 5 gpd per capita or 5,200 gallons per year per connection based on 2.85 people.

- Environmental and Social Impacts will be positive. Savings in water used will result in less demand on water supply, less sewage to be treated, and less effluent to dispose of.

- There will be no adverse Health & Safety Impacts or Technological factors.

- This program rates high because of the significant savings in water, about 35% of existing water used by washing machines.

- The Cost to implement such a program. Based on the 5,200 gallons per year savings, it would take 63 high-efficiency washing machines to save 1 acre-foot per year. Rebates for high-efficiency washing machines range from $75 to $150. Using $100 for calculation purposes, it would cost $6,300 ($100 x 63) to save 1 acre-foot of water per year. The cost of producing 1 acre-foot per year of water for the City is considerably less then the $6,300 needed to pay the incentive. Therefore, this program is not economically viable for the City at this time.

High-efficiency toilets and clothes washers account for about half of the total residential indoor water use and are somewhat unique in that California state and Federal laws have mandated the sale of these two fixtures. All new construction, as part of the Energy Policy Act of 1992 is required to use ultra-low flush toilets. With the majority of the land within the City's service area undeveloped and projected to contain residential development, newer and more efficient fixtures will help to offset water demand in the future.

Conservation Programs for Commercial Industrial and Institutional Customers
The program would bring to light methods to conserve water.

- Environmental Impact is positive but minimal. The City has very little commercial or industrial development.

- Social Impact is positive, as people are reminded of water conservation, and their 'water consciousness' will be raised.

- There are no adverse Health and Safety Impacts.

- The Cost to implement such a program would include construction of non-potable water lines that could provide landscape irrigation water and possible rebates for fixture replacements.

- The Benefit to the City would be the reduced potable water demand.

- The rating for this conservation project is low. The cost for the infrastructure to provide the non-potable water to the customer would have to be paid by the City. Most of the large irrigation users are not located close to a non-potable water line.

In the future, commercial, industrial and institutional customers could be offered non-potable landscape irrigation water if they are located near a supply line, or the infrastructure to supply this water was constructed. The City could also encourage its commercial customers to install low flow fixtures at their facilities.

2.9 Planned Water Supply Projects and Programs

(California Water Code Section 10631 (h))

The City's objective is to be self reliant and does not plan on purchasing water supplies. The City plans to utilize a greater amount from the Bunker Hill Basin by rehabilitating existing wells and constructing future wells when increased demands arise.

The City of Loma Linda's 1998 Water Master Plan's Capital Improvement Plan addressed improvements necessary for the existing system, to provide for near-term water demands as well as improvements necessary to continue to provide appropriate service through build-out. The projects where phased according to system needs at the time and recommended additional wells to be equipped and drilled between the years 2000 and 2010. The following table outlines the future water supply projects being considered by the City and there anticipated completion dates.

Table 2-11
Future Water Supply Projects

Project Name	Water Supply Source	Projected Completion Date	Normal Year [1] (AF/Yr)	Single Dry Year (AF/Yr)	Multiple Dry Water Year		
					Year 1 (AF/Yr)	Year 2 (AF/Yr)	Year 3 (AF/Yr)
Increase pumping capacity of Mountain View Well #3 from 1,000gpm to 3,000gpm	Bunker Hill Basin	2006/07	2,120	2,035	2,374	2,268	2,438
Drill and equip Richardson #5 Well -Bennet Well	Bunker Hill Basin	2006/07	2,120	2,035	2,374	2,268	2,438
Lockheed #1 (3,000 gpm)	Bunker Hill Basin	2007/08	2,120	2,035	2,374	2,268	2,438
Lockheed #2 (3,000 gpm)	Bunker Hill Basin	2007/08	2,120	2,035	2,374	2,268	2,438

[1] Normal year supply is based on 16 hours of pumping per day and 240 days per year per well. If continually pumped, each of the wells above could produce 4,500 AF/Yr.

The City is currently installing arsenic treatment at the Mountain View well site. This water supply project will increase production of this well from 1,000 gpm to 3,000 gpm. Treatment at this facility will also allow the City to treat water produced from Mountain View Well #5 which is located in close proximity.

Another water supply project that the City is undertaking in the near future is the re-drilling and equipping of the Richardson well #5 (Bennet well). The City purchased the Bennet well, which will be renamed Richardson Well #5, from the City of San Bernardino. The well is located north of the I-10 freeway, east of Waterman Avenue and west of Mountain View Avenue. This well was one of the wells the City of San Bernardino acquired when it took over the South San Bernardino County Water District water system. This well is expected to provided 3,000 gpm of additional supply for the City of Loma Linda.

Lockheed Martin is planning to drill two wells for the City of Loma Linda to mitigate groundwater contamination caused by the plume of rocket fuel from their facility in Redlands. The wells will be located within the Bunker Hill basin and drilled to a depth within the aquifer where the perchlorate is present. The anticipated production of each of these wells is 3,000 gpm. Once these wells are in operation the City will utilize Mountain View Well # 3 and Mountain View Well #5 on a standby basis.

In order to minimize the social and economic impact of water shortages, the City manages its water supplies prudently. Existing and future supply projects are designed to provide a supply during a severe or extended water shortage as nearly normal as possible. The wells will yield more if they are pumped more days per year or more hours or both.

2.10 Development of Desalinated Water

(California Water Code Section 10631 (I))

There is no opportunity for development of desalinated or brackish water.

2.11 Current or Projected Supply

(California Water Code Section 10631 (k))

The City of Loma Linda does not rely upon a wholesale agency for a source of water and is not projected to receive wholesale water in the future.

SECTION THREE

DETERMINATION OF DEMAND MANAGEMENT MEASURE IMPLEMENTATION

3.1 Evaluation of Water Demand Management Measures
(California Water Code Section 10631.5)

In evaluating applications for grants and loans the Department of Water Resources will take into consideration whether the City is implementing, or scheduled for implementation, the water demand management activities identified in Section 2.7 of this UWMP.

Under normal conditions (Stage I), the City implements the measures described in Section Two, 2.7 Demand Management Measures and those measures described in the City's Ordinance No. 443 and Chapter 13.04 and 13.32 of the City's Municipal Code.

SECTION FOUR

WATER SHORTAGE CONTINGENCY PLAN

Urban Water Shortage Contingency Analysis

This Contingency Analysis has been prepared in accordance with the guidelines in the California Water Code Section 10632 (a through I), established by the Department of Water Resources.

The City's municipal code Chapter 13.04 along with Ordinance 443 outline the stages of action to be implemented during a water shortage. The purpose is to provide water conservation measures in order to minimize the effect of a water shortage on the citizens of, and the economic well-being of the community. The municipal code adopts provisions that will significantly reduce the wasteful and inefficient consumption of water, thereby extending the available water resources required for the domestic, sanitation, and fire protection needs of the citizens served by the City while reducing the hardship on the City and the general public to the greatest extent possible.

The City's water production during the recent droughts has been sufficient to supply customer demands. The City has not had to implement Stages 2 or 3 of Ordinance 443. This is largely due to the City's construction of adequate water production facilities to meet adverse conditions. By continuing this philosophy, the City will be able to meet future demands, except under some extreme conditions where they may be forced, for a temporary period of time, to exercise the mandatory provisions of the City's Municipal Code.

Priorities for use of available water, based on California Water Code Chapter 3 and community input, are:

Health & Safety – Interior residential and fire fighting
Commercial & Governmental -- Maintain jobs and economic base
Existing Landscaping -- Especially trees and shrubs
New Demand -- Projects without permits when shortage is declared

4.1 Stages of Action

(California Water Code Section 10632 (a))

In Ordinance 443, the City has developed a three-stage action plan that includes voluntary and mandatory stages. The stages of action to be undertaken by the City in response to water supply shortages are described below along with an outline of specific water supply conditions which are applicable to each stage and the various restrictions and prohibitions included in the ordinance.

Supply Shortage Triggering Levels

The director of public services of the City shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the water conservation plan stages and shall notify the City Council of the necessity for the implementation or termination of each stage. Each declaration of the City Council implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the City's offices. Each declaration shall remain in effect until the City Council otherwise declares, as provided in this section. (Ord. 443 § 1 (part), 1991)

Exceptions may be granted by the director of public services if he finds and determines that the restrictions would cause hardship or cause an emergency condition.

In order to minimize the social and economic impact of water shortages, the City will manage water supplies prudently. This Plan is designed to provide a supply during a severe or extended water shortage as nearly normal as possible. The water shortage action plan triggering levels were established by the City Council to ensure that the above policy statements are implemented. These were shown in the Worst Case Water Supply Availability.

As the shortages become evident to the City Manager, he invokes the appropriate Stage, unless the City Council votes otherwise. Shortages may trigger a Stage at any time.

STAGE 1 - Normal Conditions Voluntary conservation measures
STAGE 2 - Threatened Water Supply Shortage - 25% Reduction in Supply
STAGE 3 - Water Shortage Emergency
Mandatory Conservation Measures - 50% Reduction in Supply

Table 4-1
Water Supply Shortage Stages and Conditions
Rationing Stages

Stage No.	Water Supply Conditions	% Shortage
Stage 1	Normal	Normal
Stage 2	Threatened Water Supply Shortage	25% Reduction in Supply
Stage 3	Water Shortage Emergency	50% Reduction in Supply

Stage 1 - Normal Conditions - Voluntary Conservation Measures
Normal conditions shall be in effect when the City is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes. (Ord. 443 § 1 (part), 1991)

Water rules and regulations in the City of Loma Linda are stipulated by Resolution No. 2241 (Adopted July 23, 2002), shown in the Appendix, hereby repealing resolution 1987. All revenues from water services become City revenues, solely for the purpose of operating, maintaining and expanding the water system and facilities.

Salient features of the water rate Resolution No. 2241 are: (1) a bi-monthly water usage charge based on meter size and minimum consumption, also its location (either inside or outside the City limits), (2) a quantity charge which increases substantially for larger blocks of usage. In general, the City of Loma Linda's rate schedule per Resolution No. 2241 is comprehensive, conservation structured and reflects the policy of direct payment per services rendered.

Resolution No. 2241 - Rate Schedule (Effective August 1, 2002)
Bi-Monthly Rates per CCF (Hundred Cubic Feet = 748 Gallons)

Table 4-2
Minimum Bi-Monthly Charge by Meter Sizes

Meter Size	Inside The City	Outside The City
5/8" x 3/4"	$18.40	$21.26
1"	$33.67	$38.73
1 ½"	$69.32	$79.72
2"	$161.41	$185.62
3"	$330.87	$375.21
4"	$502.42	$654.28
6"	$678.56	$780.34
8"	$766.62	$881.61
10"	$854.71	$982.92

Table 4-3
Water Rate Schedule

Water Usage	Inside The City	Outside The City
From 0 to 1,000 cu. ft.	$ .873	$ 1.004
From 1,001 to 40,000 cu. ft.	1.163	1.337
From 40,001 to 80,000 cu. ft.	1.279	1.471
80,001 cu. ft. and over	1.397	1.607

Stage 2 - Threatened Water Supply Shortage

In the event of a threatened water supply shortage which could affect the City's ability to provide water for ordinary domestic and commercial uses, the City Council shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the City. The City Council may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect.

Exterior Landscape Plans - Landscape plans for all new commercial and industrial developments shall provide for timed irrigation and shall consider the use of drought resistant plants. Such plans shall be presented and approved by the City prior to issuance of a water service letter.

Excessive Irrigation and Related Waste - No customer of the City or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable or excessive waste of water from such irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined.

Agricultural Irrigation - Persons receiving water from the City who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the director of public services, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.

Commercial Facilities - Commercial and industrial facilities shall, upon request of the director of public services, provide the City with a plan to conserve water at their facilities. The City will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be expected to provide the City with a plan to conserve or reduce the amount of water used by that percentage deemed by the City Council to be necessary under the circumstances. After review and approval by the director of public services, the water conservation plan shall be considered subject to inspection and enforcement by the City.

Parks, Golf Courses, Swimming Pools and School Grounds - Public and private parks, golf courses, swimming pools and school grounds which use water provided by the City shall use water for irrigation and pool filling between the hours of six p.m. and six a.m.

Domestic Irrigation - Upon notice and public hearing, the City may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.

Swimming Pool - All residential, public and recreational swimming pools, of all sizes, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.

Runoff and Wash down - No water provided by the City shall be used for the purposes of Wash down of impervious areas without specific written authorization of the director of public services. Any water used on a premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

Vehicle Washing - The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or at a commercial facility designated and so designated on the City's billing records.

Drinking Water Provided by Restaurants - Restaurants are requested not to provide drinking water to patrons except by request. (Ord. 443 § 1 (part), 1991)

Stage 3 - Water Shortage Emergency - Mandatory Conservation Measures

In the event of a water shortage emergency in which the City may be prevented from meeting the water demands of its customers, the City Council shall, if possible given the time and circumstances, immediately hold a public hearing at which customers of the City shall have the opportunity to protest and to present their respective needs to the City Council. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The director of public services is empowered to declare a water shortage emergency, subject to the ratification of the City Council within seventy-two hours of such declaration, and the following rules and regulations shall be in effect immediately following such declarations:

Prohibition - Watering of parks, school grounds, golf courses, lawn watering, landscape irrigation, Wash down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.

Restaurants - Restaurants shall not serve drinking water to patrons except by request.

Construction Meters - No new construction meter permits shall be issued by the City. All existing construction meters shall be removed and/or locked.

Commercial Nurseries and Livestock - Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary. (Ord. 443 § 1 (part), 1991)

4.2 Estimate of Minimum Supply for Next Three Years

(California Water Code Section 10632 (b))

The City receives water supplies from City owned and operated groundwater wells which derives its water from the Bunker Hill ground water basin. The location of Loma Linda's existing and projected source wells are all within the portion of the Bunker Hill Basin which is the last part of the basin that would experience water loss. The Basin contains over 5,000,000 acre feet of water and has sufficient supply for many consecutive drought years without any natural recharge. Ground water pumping within this basin has been partially controlled by a court judgement, which determined that the safe yield for the Bunker Hill Basin to be 232,100 acre-feet per year. It is believed that this control on pumping, combined with State Project Water deliveries and annual rainfall is sufficient to replenish the basin storage level for all potential future demands.

During recent droughts, water levels in neighboring basins have declined over 300 feet while levels in the City's area of the Bunker Hill Basin only dropped 60 feet, for the same time period. Due to the relative stability of the groundwater level in the lower portion of the Bunker Hill Basin, other local water purveyors are shifting their main source of supply to the Bunker Hill Basin to offset production levels in times of drought.

The following table provides an estimate of the worst case water supply available from the City's wells for the next three years. The supply is based on 16 hours per day of pumping and 240 days. Should the City required additional supply they have the option of pumping more hours or more days.

Table 4-4
Worst Case Water Supply Availability
Three-Year Estimated Minimum Water Supply (AF/Yr)

Source	Normal Supply Year (1996)	Year 1 (2006)	Year 2 (2007)	Year 3 (2008)
Bunker Hill Groundwater Wells	4,953	7,466	7,602	9,723

The normal supply year of 1996 shown above is based on the actual production figures for that year. The available supply for years 1, 2 and 3 includes the production from existing City wells in addition to the planned supply projects that will commence during this time frame. As can be seen from Table 4-4 the worst case water supply will be sufficient to meet the projected demands for the City's service area.

4.3 Catastrophic Supply Interruption Plan
(California Water Code Section 10632 (c))

Extended multi-week supply shortages due to natural disasters or accidents which damage all water sources are unlikely, but would be severe if more than one of the City's wells were out of service. The City's storage reservoirs hold 14.9 million gallons, which is sufficient treated water to meet the health and safety requirements (50) gpc for 23,000 people for 12 days. This assumes zero non-residential use.

In the event of a power shortage, the City has two portable backup generators at their disposal that they can utilize to provide supply from one well and boosting within the distribution system.

The City also has interconnections with two local water purveyors for emergency supplies. Those are the City of San Bernardino and the City of Redlands. The City also has an interconnect with the Loma Linda University water system as an emergency connection. There is no formal agreement for the exchange of water between the City and the University; however, the connection is metered to monitor any exchange of water between the two entities.

4.4 Prohibitions, Penalties, and Consumption Reduction Methods
(California Water Code 10632 (d-f))

Consumption limits in the progressively restrictive stages are imposed on different uses. These are based on percentage reductions in water allotments, and restrictions on specific uses. The individual customer allotments will be based on the previous year's use. This gives the City a basis for reviewing appeals. The specific percentage reductions at each stage are listed in Table 4-1. The City has established block rate schedules for each stage of drought to encourage compliance with the restrictions.

Mandatory Prohibitions on Water Use
Mandatory provisions to reduce water use during the different Stages are summarized earlier in this chapter. Provisions of Ordinance No.443, Section 16 Water Conservation, prohibit the watering of parks, school grounds, golf courses, lawn watering, landscape irrigation, wash-down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes.

Penalties & Charges for Excessive Use
Penalties and charges for excessive use are the heart of Ordinance 443 and the strongest incentive for conservation among the users. The City of Loma Linda's current rate structure as summarized in Table-4-3, Water Rate Schedule, as adopted July 23, 2002 per Resolution No. 2241 is included in the Appendix.

The Water Department Manager has classified each customer. Each customer is made aware of their classification. New customers and connections will be notified at the time service commences. In a disaster, prior notice of allotment may not be possible; notice will be provided by other means. Any customer may appeal the Water Department Supervisor's classification on the basis of use or the percentage on the basis of incorrect calculation. Appeals shall be processed as set forth in Ordinance 443.

Service may be terminated to any customer who knowingly and willfully violates any provision of the Water Shortage Plan and Ordinance 443.

First Violation - The first time a customer exceeds the required percentage reduction, a written warning is sent to the customer and/or property owner personally or by regular mail.

Second Violation - For a second violation of this ordinance within a 12-month period or failure to comply with the notice of violation within the period stated, a surcharge of $100 is imposed for the meter through which the wasted water was supplied.

Third Violation - For a third violation within a 12-month period, or for continued failure to comply within 30 days after notice of an imposition of second violation sanctions, a one month penalty surcharge in the amount of $200 is imposed. In addition to the surcharge, the City may, at its discretion, install a flow-restricting device at the meter. The charge to the customer for installing a flow-restricting device is based on the size of meter and the actual cost of installation but shall not be less than that provided in the City's rules and regulations. The charge for removal of the flow restricting device and restoration of normal service shall be as provided in the City's rules and regulations.

Subsequent Violations -For any subsequent violation of this ordinance within the twenty-four (24) calender months after a first violation, the penalty surcharge provided shall be imposed and the City may discontinue water service to that customer at the premises or to the meter where the violation occurred. The charge for re-connection and restoration of normal service shall be as provided in the rules and regulations of the City. Such restoration of service shall not be made until the director of public services of the City has determined that the water user has provided reasonable assurances that future violations by such user will not occur.

4.5 Analysis of Revenue Impacts on Reduced Sales During Shortages
(California Water Code Section 10632 (g))

Revenues will be impacted when, reduced water sales during the various stages as set forth in the City's Water Shortage Contingency Plan, are initiated. In order to minimize the financial impact this would have on the City, the monthly fixed revenues (monthly meter charges) need to cover the majority of the fixed costs of the City's water system during such an event.

The fixed costs are incurred by the City regardless of how much or when it delivers water to the customer. These costs generally include administration, personnel, billing, testing, maintenance, meter maintenance, pipeline and facility replacements.

Expenditures during periods of drought may be impacted by additional staffing or advertising costs. Expenses such as capital improvements should be deferred during this reduction in sales when feasible. The City, which produces all of the water consumed by its customers, will not have the added cost of a more expensive purchased water source.

In order to mitigate the financial impacts of a water shortage, the City maintains excess funds in the Water Enterprise Fund (Fund). This Fund is used for all operations associated with the running of the water system. Part of the Fund can be used to stabilize rates during periods of water shortage or disasters affecting the water supply. The City has a current balance of $2.1 million dollars in the Fund.

Even with the additional monies in the Fund, rate increases may be necessary during a prolonged water shortage. The City may wish to increase the fixed monthly meter service charge to cover the shortfall in revenue resulting from the decrease in water sales during a water shortage. The additional revenues would also help to cover any increased operating and water expenses that occur.

The experiences of California water purveyors during the 1990-91 drought shortage demonstrated that actual water use reductions by customers are usually larger that those requested by the supplier. During the 1990-91 drought shortage it was also politically difficult for many agencies to adopt the rate increases necessitated by a 20 to 50 percent reduction in sales.

After an extended water shortage, water revenues are expected to fall below pre-shortage levels. The water use is projected at 90% of the pre-shortage use, which could result in a reduction of revenue during the twelve month period after the end of a water supply shortage.

As described in Table 4-1, a water supply shortage calls for a reduction in water consumption, mandatory conservation measures and prohibited water uses. When a water shortage emergency is declared, the supply shortage will trigger the appropriate rationing stage and appropriate charges and penalties.

The City is currently undergoing a rate review. The review will analyze the existing rate structure, and formulate changes that would allow the City to meet their fixed annual expenditures with fixed revenue. The monthly meter charge is a fixed revenue that the City will receive regardless of the amount of water consumed. An increase in fixed revenue will help to offset any loss of revenue seen during a reduction in consumption due to the implementation of any of the stages of action outlined in Ordinance 443.

4.6 Draft Ordinance and Use Monitoring Procedure
(California Water Code Section 10632 (h-I))

Implementation of the Plan - In the event of a threatened water supply shortage which could affect the City's ability to provide water for ordinary domestic and commercial uses, the City Council shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the City. The City Counsel may then, by resolution, declare a water shortage condition to prevail.

Water Use Monitoring Procedures - The director of public services of the City shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the water conservation plan stages and shall notify the City Council of the necessity for the implementation or termination of each stage. Each declaration of the City Council implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the City's offices. Each declaration shall remain in effect until the City Council otherwise declares, as provided in this section.

Stage 1 - Normal Condition - Monitoring Procedure
In normal water supply conditions, production figures are recorded daily. Totals are reported daily on a continuous computerized monitoring system to the Water Department Supervisor. Totals are reported monthly to the City Administrator and incorporated into the water supply report to the Utilities Commission.

Stage 2 - Threatened Water Supply Shortage - Monitoring Procedure
During a Stage 2 water shortage, daily production figures are reported to the Supervisor. The Supervisor compares the daily production to the target daily production to verify that the reduction goal is being met. Reports are forwarded to the City Administrator on an as-needed basis, continuously if appropriate. Monthly reports are sent to the Utility Commission. If reduction goals are not met, the Administrator will notify the City Council so that corrective action can be taken.

Stage 3 - Water Shortage Emergency - Monitoring Procedure
During a Stage 3 water shortage, the procedure listed above will be followed.

Disaster Shortage
During a disaster shortage, the City Administrator will report continuously to the City Council and inform the San Bernardino County Office of Emergency Services. Special Council meetings can be convened should authorization for special action be needed.

A coordinated response to water supply shortages is necessary for uniformity in developing, implementing and enforcing Drought Contingency Plans. The City's primary source of water is groundwater wells within the Bunker Hill Basin. SBVMWD's primary function is to plan and develop a long-range water supply for water agencies within this Basin.

SECTION FIVE

RECYCLED WATER PLAN

5.1 Coordination

(California Water Code Section 10633)

Sewer facilities within the City of Loma Linda and within the City's sphere of influence are operated and maintained by the City's Department of Public Works, Utilities Division. Sewer line maintenance is preformed by the City while wastewater treatment is provided under provisions outlined in a joint powers agreement with the City of San Bernardino. The San Bernardino Municipal Water Department's primary and secondary Water Reclamation Facility is located in the City of San Bernardino, about a mile northwest of the City of Loma Linda.

5.2 Wastewater Quantity, Quality, and Current Uses

(California Water Code Section 10633 (a-c))

The San Bernardino Municipal Water Departments Water Reclamation Facility which currently processes 28 million gallons per day (mgd), has the capability of treating up to 33 mgd of effluent. Based on flow monitoring, the average daily wastewater flow generated by the City of Loma Linda is 3 mgd, which is about 40% of their 7 mgd allotment in the treatment facility. The average wastewater flow generated from the City at build-out is projected to be 6.27 mgd.

The cities of San Bernardino and Colton wastewater treatment plants jointly operate the Rapid Infiltration and Extraction (RIX) facility (tertiary treatment) in the City of Colton. Secondary treated water from the Water Reclamation Facility is sent to the RIX facility located approximately 4.5 miles away. The secondary-treated water undergoes the final filtering and disinfecting process to produce wastewater that is superior or equivalent to those produced by conventional tertiary filtration systems. The reclaimed water is then discharged into the Santa Ana River where it contributes to other existing water flows and adds to the habitat for several kinds of fish and birds.

A small amount of treated water from the Water Reclamation Facility is used by Caltrans to irrigate a one mile section of the 215 freeway. The Water Reclamation Facility also sends water to the San Bernardino Golf Course for irrigation.

The guiding policy in the City of Loma Linda's Draft General Plan proposes to implement policies that would investigate the use of reclaimed wastewater. Where reclaimed wastewater can be economically delivered, the City of Loma Linda will require the installation of dual water system supplies for irrigation and industrial purposes.

5.3 Potential and Projected Use, Optimization Plan

(California Water Code Section 10633 (d-g))

In 2002, in an effort to conserve potable water, the City of Loma Linda's Department of Public Works contracted with ***ERSC*** to identify short-term and long-term non-potable/reclaimed water needs within the City and its sphere of influence. The report analyzed the feasibility of constructing a water reclamation facility along the City's main sewer interceptor and examined the financial and physical feasibility of installing water service facilities that would provide storage and transmission line capacities for such a system.

The report analyzed and inventoried the irrigation users and the total amount of irrigation use within the City. The total long term potential for irrigation is estimated to be in excess of 2.5 million gallons per day for peak day usage.

The report concluded that it was not cost effective for the City of Loma Linda to own and operate its own wastewater reclamation facility and that it was more practical for the City of Loma Linda to purchase surplus reclaimed water from the City of Redlands or utilize non-potable water supplies for irrigation.

The report identified that the bulk of the existing irrigation water is being utilized by numerous irrigation meters located along Mountain View Avenue and Prospect Avenue. The infrastructure to provide these users is not in place and would have to be constructed by the City as these services are in an area that is fully developed.

Potential future recycled water use in the service area is expected to be in the north east and southern sections of the service area which are not yet developed. These areas will contain residential units that could utilize non-potable water for landscape irrigation.

The City is investigating the use of non-potable water to supplement future irrigation demands and in some cases existing irrigation demands. The City of Loma Linda has 168 metered irrigation connections within their system. These meters are not on a separate non-potable water system, and the feasibility of constructing a non-potable pipeline system is not known. Therefore non-potable water would likely be available to only new developments and irrigation demands in close proximity to the City of Redlands' non-potable water system.

Non-potable water for the City of Loma Linda is planned to be provided from surplus non-potable water purchased from the City of Redlands or from existing wells that the City is not able to utilize for potable water demands. The City of Loma Linda has numerous wells with contaminates that exceed the maximum contaminate levels mandated by the Department of Health Services that they are not utilizing. These wells could be used for irrigation in a dual piping system by the City of Loma Linda for new developments. As the City's existing non-potable wells are all located at the north end of the City, further investigation into the technical and economic feasibility of such a system would have to be done.

Table 5-1
Potential Future Use of Recycled Water in Service Area (AF/Yr)

Type of Use	2010	2015	2020	2025
Residential Irrigation - dual water system	977	1,241	1,557	2,071

The City of Loma Linda is requiring all new developments to construct dual water systems for a greater conservation of potable water. The Department of Health Services' requirements for dual water systems are contained in Article 5, Chapter 3, Title 22, of the California Code of Regulations (June 2001 Edition). The Department of Health Services requirements are the same for recycled water or non-potable water. The City could pass the cost for the non-potable water lines on to new developers and the City would pay for over sizing reimbursement for transmission lines. This dual water system would be served from the City's non-potable groundwater wells or by excess non-potable water purchased from the City of Redlands.

The City of Redlands is currently implementing a non-potable water system. The existing system spans from Mountain View Avenue to Texas Avenue, and from the Santa Ana River south to the I-10 freeway. The system will expand further south to include the area up to Barton Road, and eventually throughout the City of Redlands' entire service area.

Redlands existing non-potable service area borders the City of Loma Linda to the west and could serve non-potable water to the planned new residential development in the north east section of the City's service area. Redlands also has two (2) irrigation lines further south (Bear Valley Extension Canal and the B-Contract Pipeline) that extend into the City of Loma Linda's service area that are currently providing water to orange groves in the area. In the future when these orange groves become residential development, these lines could be used to supply residential irrigation demands.

The City of Loma Linda is negotiating with the City of Redlands for some of their surplus non-potable water to supply irrigation demands that would otherwise utilize potable water. This would make available more potable supply for the City of Loma Linda.

The City of Loma Linda has a long standing policy of purchasing Bear Valley Water shares whenever they become available. The City has just purchased 705 shares from the Loma Linda University Foundation. Bear Valley Water is currently being used to irrigate both Hulda Crooks Park (50 acres) and Leonard Bailey Park (10 acres).

5.3.1 Financial Incentives to Promote the Use of Recycled Water

The City of Redlands plans to provide recycled, non-potable water to the City of Loma Linda at a rate less then what the City of Redlands currently charges for potable water. It is not known at this time what price the City of Redlands would charge to provided recycled water to the City of Loma Linda or what price the City of Loma Linda would then provide it to their customers.

The City could encourage the use of non-potable water by providing it at a reduced rate to the consumer. Facilities such as schools, parks, community centers, car washes and churches could benefit from a reduced rate of water for their non-potable water demands.

SECTION SIX

WATER QUALITY IMPACTS ON RELIABILITY

6.0 Water Quality
(California Water Code Section 10634)

A number of Loma Linda's groundwater wells within the basin have tested positive for various chemical contaminants and their use has been reduced or discontinued, which has translated into a loss of pumping capacity. Other wells have required treatment and in some areas blending. The City is currently utilizing five of it's six wells to supply the distribution system. The sixth well is high in arsenic and flourides and its use has been discontinued.

The Bunker Hill groundwater basin, which is the City's source of supply, is currently contaminated with plumes of various chemical pollutants. There are three major plumes that effect the basin for the City of Loma Linda. The following table contains a list of the plumes, their locations within the basin and their chemical contaminant.

Due to the location of the Norton Air Force Plume and the Camp Ono/Newmark Plume within the basin and the historical flow of the groundwater, contamination of the City's wells from these two sources in the future is not expected. Should future sources of water for the City show signs of chemical contaminants, the City will make provisions for wellhead treatment should it be necessary.

Table 6-1
Contamination Plumes

Plume Designation	Location in Basin	Chemical Contaminant
Lockheed Plume	Northeast	Perchlorate
Norton Air Force Plume	East	Volatile Organic Compounds (VOC)
Camp Ono/Newmark Plume	North	Volatile Organic Compounds (VOC)

There are three aquifers within the basin, the lower aquifer which in some areas contains high levels of fluorides and arsenic, the middle, which has perchlorate and volatile organic compounds, and the upper level, which in many areas near Loma Linda contains high levels of nitrates, pesticides and herbicides from past agricultural use.

The perchlorate problems are due to contamination originating from the Lockheed Martin Propulsion Corporation site located on Crafton Avenue in Redlands, California (**Figure-3**). Lockheed Martin was in operation between 1961 to 1974, as a research and production facility of solid fuel rockets and solid rocket propellant for the military. For years the facility disposed of hazardous waste on site, including perchlorate, which resulted in contamination of the groundwater. Due to this fact, Lockheed Martin is in the process of replacing two groundwater wells for the City.

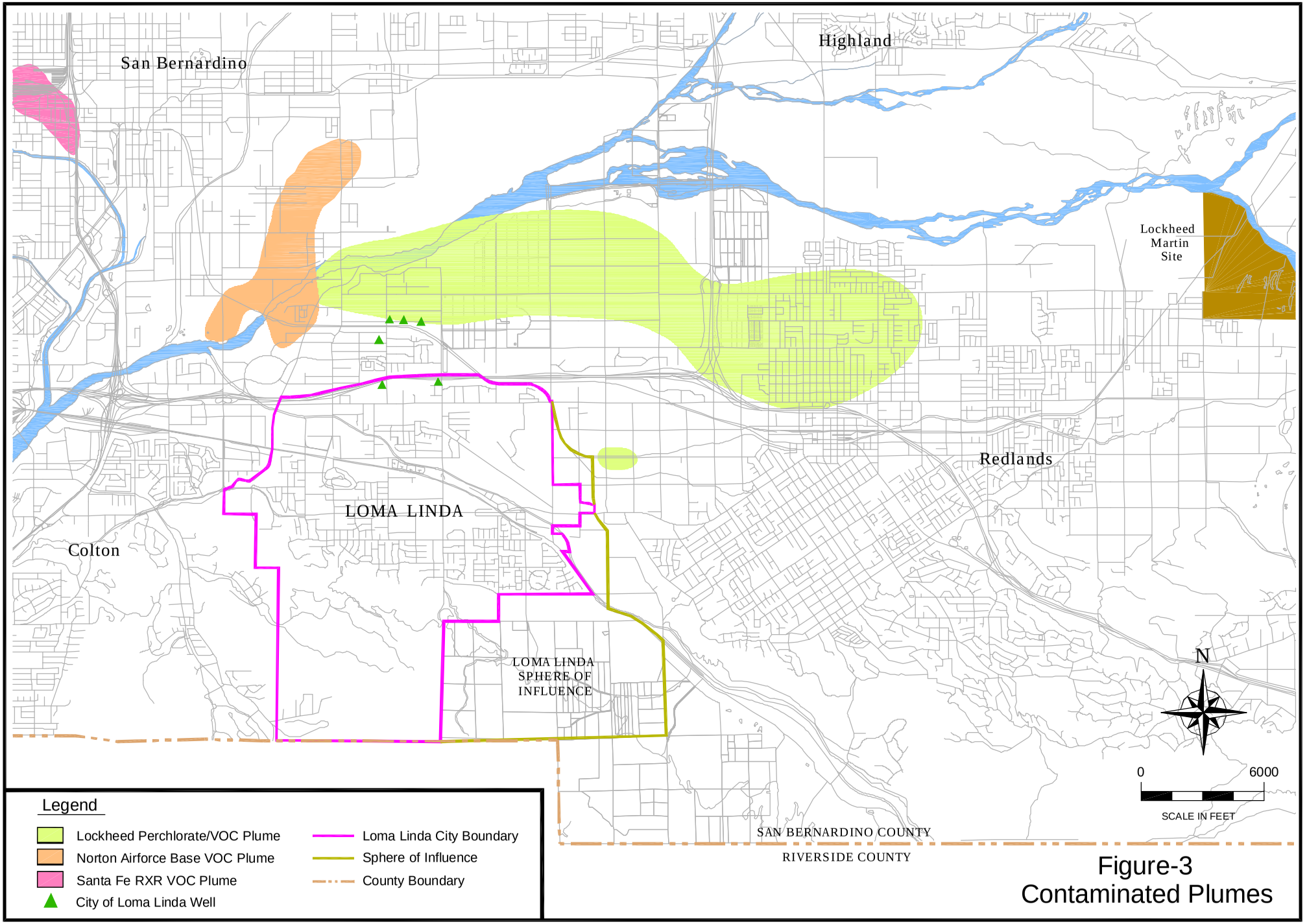

Figure-3
Contaminated Plumes

The Lockheed Martin wells will be drilled down to levels within the aquifer where the perchlorate is present and equipped with well head treatment. These new wells are being drilled in response to an order from the Santa Ana Regional Water Quality Control Board requiring Lockheed Martin to mitigate groundwater contamination in Redlands, Loma Linda, and Riverside, California.

It is not clear when the perchlorate contamination first reached the City of Loma Linda wells, because monitoring did not begin until 1997, when it was discovered in two of the wells in the City of Loma Linda's municipal drinking water system.

In response to high fluoride, perchlorate and DBCP levels detected in Richardson Well #1, 3 and 4, the City submitted a blending plan to the Department of Health Services on May 23, 2001 for these wells. The Richardson wells have varying levels of contaminants and are now blended to achieve lower concentrations which reduces the maximum contaminant level (MCL) to within acceptable limits.

In February of 2002, the EPA published a new standard for arsenic, lowering the MCL to 10 ppb from 50 ppb. The date by which systems must comply with the new 10 ppb standard is January 23, 2006. Of the City's five operational wells, arsenic levels in excess of 10 ppb have been detected in four of them. With the blending plan in place for the Richardson Wells #1, 3 and 4 the City is able to blend the supply below the new EPA standard.

Mountain View Well #3 is being equipped with arsenic treatment that can treat up to 3,000 gpm. This treatment facility will allow the City to treat water from Mountain View Well #3 or from Mountain View Well #5 which is located near by.

Table 6-2
Existing Water Production Wells

Well	Arsenic	Flouride	Perchlorate	DBCP
Mountain View #3	✔			
Mountain View #5	✔			
Richardson #1			✔	✔
Richardson #3				
Richardson #4	✔	✔		

The City of Loma Linda's water supply meets or exceeds all current health and safety standards. The City continues to improve their water system to meet both supply demands and future quality standards.

SECTION SEVEN

WATER SERVICE RELIABILITY

7.1 Projected Normal Water Year Supply and Demand
(California Water Code Section 10635 (a))

An assessment on the reliability to provide water service to the customers within the City during normal, single dry, and multiple dry water years was performed and is reflected in the following tables. The assessment compares the water supply sources available to the City with the projected water use over the next 20 years and is based on the information compiled in Section Two.

Supply is based on standard pumping practices and is not the total pumping capacity of the wells. Typical well operation is 16 hours per day pumping during off-peak Southern California Edison time periods. Production for a given year, using 16 hours per day, range from 240 to 280 days. The projected supply for the City is based on these standard pumping practices and are reflected in the following tables.

Although all of the water supplies in the following tables are projected to be available to the City, should it be required, the City may use more or less from any particular source. Factors that affect the City's production may include pumping costs associated with certain wells, treatment costs, water quality, system demands, and the City's ability to utilize the source.

The normal water year supply is based on an average water supply year. Well production is based on existing production as shown in Table 2-4 and from the future supply projects as outlined in Table 2-10. The supply shown in Table 7-1 for the years 2010 through 2020 includes future capacity from the City's wells in the Bunker Hill Basin, but does not include the capacity from Mountain View wells #3 and #5 which will be used as standby sources when the Lockheed Martin wells are utilized, nor does it include the capacity from Mountain View #4 which is experiencing high levels of flouride and arsenic. In 2025, supply from Mountain View #5 will be required to meet projected demands.

Demands for water will be influenced by seasonal conditions and by development within the service area. The majority of the undeveloped land within the service area is planned for residential usage as outlined in the City's Draft General Plan. The demands used in the tables in this section include residential, commercial, agricultural, and unaccounted for water, and are based on the demand projections from Table 2-9.

Table 7-1
Projected Normal Water Year Supply (AF/Yr)

Source	2010	2015	2020	2025
SUPPLY [(1)]	9,723	9,723	9,723	12,056
% of Normal Year [(2)]	**196%**	**196%**	**196%**	**243%**

[(1)] Based on 16 hours of pumping per day, 240 days per year.
[(2)] Based on 4,953 AF/Yr which is the normal water year as shown in Table 2-7.

Table 7-2
Projected Normal Water Year Demand (AF/Yr)

Source	2010	2015	2020	2025
DEMAND	6,851	7,852	8,971	10,540
% of year 2005 [(1)]	**122%**	**140%**	**160%**	**188%**

[(1)] Based on the demand of 5,597 AF/Yr for the year 2005 in Table 2-8. This number includes unaccounted for water within the system.

Table 7-3
Projected Normal Water Year Supply and Demand Comparison (AF/Yr)

Source	2010	2015	2020	2025
SUPPLY Totals	9,723	9,723	9,723	12,056
DEMAND Totals	6,851	7,852	8,971	10,540
DIFFERENCE	**2,872**	**1,871**	**752**	**1,516**
DIFFERENCE as % of Supply	**30%**	**19%**	**8%**	**13%**
DIFFERENCE as % of Demand	**42%**	**24%**	**8%**	**14%**

The City plans to develop adequate water supplies to meet future demands during both normal and drought conditions. The of water supply projected to be available is more than sufficient to provide the City's demands during a normal water year through to the year 2025.

7.2 Projected Single Dry Year Supply and Demand Comparison

Water use patterns during a dry year will differ from those in a normal water year. Irrigation demands may increase and reduction in demands resulting from implemented rationing may occur. There are no substantial agricultural demands within the City that will affect demand.

In a single dry water year as seen in 1994, supply is projected to be 96% of a normal water year. The projected supply shown in Table 7-4 for the year 2010 and 2015 includes future water supply projects, but does not include capacity from Mountain View wells #3, #4 or #5. Supply from Mountain View well #5 is projected to be required in 2020 during a single dry water year and both Mountain View #3 and #5 are projected for 2025. The following tables represent projected supply and demand during a single dry water year.

Table 7-4
Projected Single Dry Year Water Supply (AF/Yr)

Source	2010	2015	2020	2025
SUPPLY [(1)]	9,334	9,334	11,574	13,611
% of projected Normal [(2)]	**96%**	**96%**	**96%**	**96%**

[(1)] Based on 16 hours of pumping per day, 240 days per year.
[(2)] Based on the projected normal supply from Table 7-1.

Table 7-5
Projected Single Dry Year Water Demand (AF/Yr)

Source	2010	2015	2020	2025
DEMAND	6,851	7,852	8,971	10,540
% of projected Normal [(1)]	**100%**	**100%**	**100%**	**100%**

[(1)] Based on the projected normal demand from Table 7-2 .

Table 7-6
Projected Single Dry Year Supply and Demand Comparison (AF/Yr)

Source	2010	2015	2020	2025
SUPPLY Totals	9,334	9,334	11,574	13,611
DEMAND Totals	6,851	7,852	8,971	10,540
DIFFERENCE	**2,483**	**1,482**	**2,603**	**3,071**
DIFFERENCE as % of Supply	**27%**	**16%**	**22%**	**23%**
DIFFERENCE as % of Demand	**36%**	**19%**	**29%**	**29%**

With the amount of water projected to be available to the City during a single dry year water event, it is not expected that the City will have to implement any of the rationing programs available to them.

7.3 Projected Multiple Dry Year Supply and Demand Comparison

The annual production for all of the water sources available to the City during multiple dry years is based on standard pumping practices. Within the next five years, changes in production capacity will be affected by several planned water supply projects being implemented by the City. They include the rehabilitation of Mountain View Well #3 which will increase production of that well from 1,000 gpm to 3,000 gpm, the drilling and equipping of the Richardson #5 well and the two (2) new wells that are to be drilled by Lockheed Martin.

As shown in Table 2-11, the rehabilitation of Mountain View well #3 is expected to be completed 2006/07. The drilling and equipping of the Richardson #5 well (Bennet well) is scheduled for 2006/07 and the construction of the two (2) Lockheed Martin wells is expected to be completed in 2007/08. When the two (2) Lockheed Martin wells have been placed into service, Mountain View Wells #3 and #5 will be placed on standby. There are no current plans to utilize Mountain View Well #4 which is high in flouride and arsenic.

Demands as seen in the multiple dry years of 2002-2004 were assumed to have increased above normal year consumption due to an increase in residential irrigation demands. During a multiple dry year cycle residential irrigation users tend to irrigate more days of the year. A normal irrigation season runs 240-280 days per year, but during a dry cycle that can increase up to 300 days. This report assumes the increase in irrigation will range from 107% to 115% above normal usage as shown in Table 2-7 and as seen during the multiple dry year cycle of 2002-2004.

The demands used in the following tables reflect this increased demand. Future demands include residential, commercial, agricultural, and unaccounted for water usage and are based on the demand projections from Table 2-9.

A drought condition for the year 2006 is not expected, but for purposes of this assessment, the production from the wells would need to be calculated on 280 days per year and 16 hours per day. In 2007 Mountain View well #3 is projected to supply the system while Mountain View #5 is utilized as a standby source. The years 2008 through 2010 include supply from the Lockheed Martin wells and Richardson well #5 (Bennet well) but not Mountain View wells #3 or #5. Should the City need additional supply, they will be able to utilize Mountain View wells #3 and #5.

Table 7-7
Projected Supply During Multiple Dry Year Period Ending in 2010 (AF/Yr)

Source	2006	2007	2008	2009	2010
SUPPLY [(1)]	7,466	7,602	9,723	9,723	9,723
% of projected Normal	**100%**	**100%**	**100%**	**100%**	**100%**

[(1)] Based on 16 hours of pumping per day, 280 days per year for 2006 and 240 days per year for the years 2007 through 2010.

Table 7-8
Projected Demand During Multiple Dry Year Period Ending in 2010 (AF/Yr)

Source	2006	2007	2008	2009	2010
DEMAND	6,551	6,526	7,302	7,590	7,879
% of projected Normal [(1)]	**112%**	**107%**	**115%**	**115%**	**115%**

Table 7-9
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2010 (AF/Yr)

Source	2006	2007	2008	2009	2010
SUPPLY Totals	7,466	7,602	9,723	9,723	9,723
DEMAND Totals	6,551	6,526	7,302	7,590	7,879
DIFFERENCE	**915**	**1,076**	**2,421**	**2,133**	**1,844**
DIFFERENCE as % of Supply	**12%**	**14%**	**25%**	**22%**	**19%**
DIFFERENCE as % of Demand	**14%**	**16%**	**33%**	**28%**	**23%**

The City is projected to have 100% of its projected normal supply during multiple dry year periods. The City's wells within the Bunker Hill groundwater basin are located in an area that will be the last area affected by drought conditions.

The water supply during 2011 through 2015 assumes all proposed sources will be available. In the event water supplies decrease beyond predicted levels, the City can utilize water from Mountain View Wells # 3 and #5 which will have been placed on standby once the Lockheed Martin wells are constructed.

Table 7-10
Projected Supply During Multiple Dry Year Period Ending in 2015 (AF/Yr)

Source	2011	2012	2013	2014	2015
SUPPLY [(1)]	9,723	9,723	9,723	9,723	9,723
% of projected Normal	**100%**	**100%**	**100%**	**100%**	**100%**

[(1)] Based on 16 hours of pumping per day, 240 days per year.

Table 7-11
Projected Demand During Multiple Dry Year Period Ending in 2015 (AF/Yr)

Source	2011	2012	2013	2014	2015
DEMAND	7,897	7,759	8,570	8,800	9,030
% of projected Normal	**112%**	**107%**	**115%**	**115%**	**115%**

Table 7-12
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 (AF/Yr)

Source	2011	2012	2013	2014	2015
SUPPLY Totals	9,723	9,723	9,723	9,723	9,723
DEMAND Totals	7,897	7,759	8,570	8,800	9,030
DIFFERENCE	**1,826**	**1,964**	**1,153**	**923**	**693**
DIFFERENCE as % of Supply	**19%**	**20%**	**12%**	**9%**	**7%**
DIFFERENCE as % of Demand	**23%**	**25%**	**13%**	**10%**	**8%**

Due to the fact that the City is projected to have an abundance of supply, the demands during a multiple dry year period do not reflect rationing implemented during a water shortage. Demands are shown to increase above normal usage due to increased irrigation demands.

The water supply during 2016 through 2020 assumes all proposed sources will be available. In 2018 during the third year of a multiple dry year period supply is projected to be required from the planned water sources and from Mountain View well #5. Should the City require additional supply, they would be able to utilize Mountain View well #3.

Table 7-13
Projected Supply During Multiple Dry Year Period Ending in 2020 (AF/Yr)

Source	2016	2017	2018	2019	2020
SUPPLY [(1)]	9,723	9,723	12,056	12,056	12,056
% of projected Normal	**100%**	**100%**	**100%**	**100%**	**100%**

[(1)] Based on 16 hours of pumping per day, 240 days per year.

Table 7-14
Projected Demand During Multiple Dry Year Period Ending in 2020 (AF/Yr)

Source	2016	2017	2018	2019	2020
DEMAND	9,045	8,881	9,801	10,059	10,317
% of projected Normal	**112%**	**107%**	**115%**	**115%**	**115%**

Table 7-15
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2020 (AF/Yr)

Source	2016	2017	2018	2019	2020
SUPPLY Totals	9,723	9,723	12,056	12,056	12,056
DEMAND Totals	9,045	8,881	9,801	10,059	10,317
DIFFERENCE	**678**	**842**	**2,255**	**1,997**	**1,739**
DIFFERENCE as % of Supply	**7%**	**9%**	**19%**	**17%**	**14%**
DIFFERENCE as % of Demand	**7%**	**9%**	**23%**	**20%**	**17%**

Due to the fact that the City is projected to have an abundance of supply, the demands during a multiple dry year period do not reflect rationing implemented during a water shortage. Demands are shown to increase above normal usage due to increased irrigation demands.

The projected demand from 2021 through 2025 is based on normal usage and does not take into account rationing implemented during a water shortage. The supply assumes all proposed sources will be available. In the years 2021 through 2023 supply is projected to be required from Mountain View well #5 and in the years 2024 and 2025, additional supply from Mountain View well #3 is projected to be required.

Table 7-16
Projected Supply During Multiple Dry Year Period Ending in 2025 (AF/Yr)

Source	2021	2022	2023	2024	2025
SUPPLY [(1)]	12,056	12,056	12,056	14,178	14,178
% of projected Normal	**100%**	**100%**	**100%**	**100%**	**100%**

[(1)] Based on 16 hours of pumping per day, 240 days per year.

Table 7-17
Projected Demand During Multiple Dry Year Period Ending in 2015(AF/Yr)

Source	2021	2022	2023	2024	2025
DEMAND	10,399	10,271	11,399	11,760	12,121
% of projected Normal	**112%**	**107%**	**115%**	**115%**	**115%**

Table 7-18
Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 (AF/Yr)

Source	2021	2022	2023	2024	2025
SUPPLY Totals	12,056	12,056	12,056	14,178	14,178
DEMAND Totals	10,399	10,271	11,399	11,760	12,121
DIFFERENCE	**1,657**	**1,785**	**657**	**2,418**	**2,057**
DIFFERENCE as % of Supply	**14%**	**15%**	**5%**	**17%**	**15%**
DIFFERENCE as % of Demand	**16%**	**17%**	**6%**	**21%**	**17%**

In order to minimize the social and economic impact of water shortages, the City manages its water supplies prudently. Existing and future supply projects are designed to provide a supply during a severe or extended water shortage as nearly normal as possible. The City is expected to be able to provide sufficient supply to meet all of its future demands during normal, single dry, or multiple dry water years.

SECTION EIGHT

ADOPTION AND IMPLEMENTATION OF THE URBAN WATER MANAGEMENT PLAN